Kolpin Powersports 180cc Service Manual

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FIG-01 INFORMATION

SAFETY

GASOLINE

Gasoline is extremely flammable and is explosive under certain condition. Do not smoke or allow sparks or flames in your work area.

CARBON MONOXIDE

Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

BATTERY ELECTROLYTE

The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. If you come into contact with the electrolyte, flush the area thoroughly with water. If you get the electrolyte in your eyes, flush with water and contact a doctor immediately.

HOT PARTS

Engine and exhaust pipe become very hot and remain hot for one hour after the engine is run. Wear insulated gloves before handling these parts.

USED ENGINE /GEAR OIL

Used engine oil and gear oil may cause skin disease after repeated contact with the skin for long periods. Keep out of reach of children.

NOTES

All information, illustrations, directions and specifications included in this publication are base on the latest product information available at the time of approval for printing.

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FIG-01 INFORMATION

SPECIFICATIONS

TYPE		OVERLAND – 180CC
ENGINE TYPE		Air-Cooled 4-stroke, with Oil Cooler, Horizontal Stroke
CYLINDER NUMBER		1
DISPLACEMENT		169 cc
BORE STROKE		∮ 61×57.8mm
COMPRESSION RATIO		9.1:1
MAX. TORQUE		6.37 Nm@4403 rpm
CARBURETOR		MIKUNI 180
STARTING		Electric/ Kick back-up
LUBRICATE		Forced pressure and wet sump
LUBR. CAPABILITY		1 Liter
TRANSMISSION		Automatic (C.V.T V-belt system)
SUSPENSION	FRONT	Single A-Arm
	REAR	Single Swing Arm
BRAKE	FRONT	Drum
	REAR	Disc
TIRE	FRONT	21× 7- 10”
	REAR	21× 10- 8”
OVERALL DIMENSION		1740×990×1060 mm
WHEELBASE		1065 mm
DRY WEIGHT		165 kg
FUEL		Unleaded Gasoline
FUEL CAPABILITY		8 Liter
Ignition		Capacitor Discharge
Air Cleaner		AE-9

Specifications subject to change without notice.

FIG-01 INFORMATION

SERIAL NUMBER

The frame serial number is stamped on the front frame.

The engine number is stamped under the crankcase.

FIG-01 INFORMATION

TORQUE VALUES

STANDARD

5mm bolt and nut	5 N.m (3.5 lbs.ft)
6mm bolt and nut	10 N.m (7.2 lbs.ft)
8mm bolt and nut	22 N.m (16 lbs.ft)
10mm bolt and nut	35 N.m (25 lbs.ft)
12mm bolt and nut	55 N.m (40 lbs.ft)

ENGINE

Cylinder head nut	28 N.m (20.7 lbs.ft)
Spark plug	12 N.m (8.9 lbs.ft)
Cylinder head bolt	20 N.m (14.8 lbs.ft)
Alternator bolt	8 N.m (5.9 lbs.ft)

FRAME

Handlebar upper holder bolt	24 N.m (17.7 lbs.ft)
Throttle housing cover screw	4 N.m (2.9 lbs.ft)
Steering shaft nut	50 N.m (36.9 lbs.ft)
Steering shaft holder bolt	33 N.m (24 lbs.ft)
Wheel rim bolt	18 N.m (13.3 lbs.ft)
Tie rod lock nut	35 N.m (25.8 lbs.ft)
King pin nut	40 N.m (29 lbs.ft)
Handlebar lower holder nut	40 N.m (29.5 lbs.ft)
Front wheel bolt	24 N.m (17.7 lbs.ft)
Front axle nut	60 N.m (44 lbs.ft)
Front brake arm nut	4 N.m (3.0 lbs.ft)
Rear brake arm nut	7 N.m (5.2 lbs.ft)
Rear axle nut	60 N.m (44.3 lbs.ft)
Rear wheel bolt	24 N.m (17.7 lbs.ft)
Exhaust muffler mounting bolt	30 N.m (22.1 lbs.ft)
Engine hanger bolt	30 N.m (22 lbs.ft)
Rear axle holder bolt	90 N.m (65 lbs.ft)
Swing arm pivot nut	90 N.m (65 lbs.ft)
Rear shock absorber mounting nut	45 N.m (33 lbs.ft)

MEMO

FIG-02. Vehicle Inspection

MAINTENANCE DATA

SPARK PLUG

Spark plug cap	0.6-0.7mm
Recommended spark plugs	NGK C7HSA or CR7HSA
Throttle lever free play:	5-10mm
Idle speed	1800rpm
Brake lever free play:	10~20mm
Drive chain slack	15-25mm
Front/rear tire size	21x7-10” / 21x10-8”
Front/rear tire pressure	3±0.3psi (0.15 kgf/cm^2)
Toe-in	5±10mm

TORQUE VALUES

Spark plug	12-19 N.m
Tie-rod lock nut	35-43 N.m

ENGINE OIL

Viscosity:	SAE 15W-40

GEAR LUBRICATION OIL

Viscosity:	SAE 85W-140

FIG-02. Vehicle Inspection

MAINTENANCE SCHEDULE

The maintenance intervals in the follow table are based upon average riding conditions. Riding in unusually dusty areas requires more frequent servicing.

Service Item	Initial Service (First 30 hours)	Every 100 hours	Every 200 hours	Every 300 hours
ENGINE OIL	**R**	**R**		
GEAR OIL	**R**		**R**	
FUEL FILTER				**R**
AIR VLEAN FILTER				**R**
ENGINE OIL FILTER				**C**
CARBURETOR				**I**
SPARK PLUG			**C**	
VALVE GAP				**A**
IGNITION TIMING				**A**
CHAIN			**A**	
BATTERY			**I**	
DRIVE BATTERY				**I**
CLUTCH				**I**
THROTTLE OPERATE			**I**	
TIRE PRESSURE	**Check before riding each time**			
BRAKE SYSTEM	**Check before riding each time**			
NUTS/BOLTS				**T**

A: Adjust C: Clean I: Inspection R: Replace T: Tighten

FIG-02. Vehicle Inspection

FUEL TUBE

Inspect the fuel lines for deterioration, (a-1) damage or leakage and replace if necessary. (Photo 1)

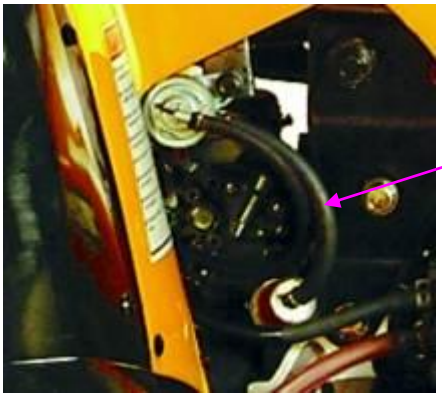


Photo 1

THROTTLE OPERATION

1. Inspect for smooth lever operation, full opening and automatic full closing in steering positions.
2. Inspect for deterioration, damage, cuts and nicks, or kink in the throttle cable, replace it if necessary.
3. Check the throttle lever, free play should be not more than 5-10 mm at the tip of the throttle lever. (a-1)
4. Disconnect the throttle cable at the upper end. Lubricate the cable with commercially lubricant to prevent premature wear.

(Photo 2)

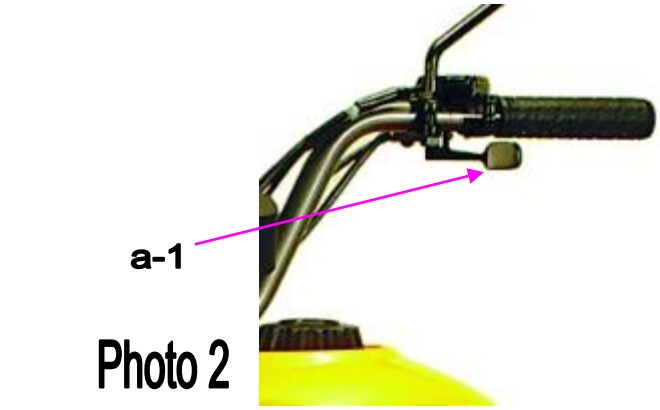


Photo 2

THROTTLE CABLE ADJUSTMENT

Slide the rubber cap of the adjuster off the throttle housing, loosen the lock nut and adjust the free play of the throttle lever by turning the adjuster on the throttle housing. Inspect the free play of the throttle lever. (a-1) (Photo 3)

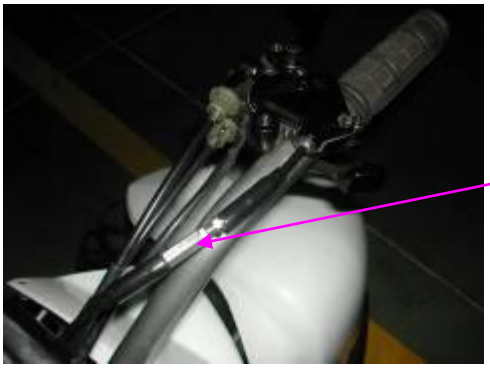


Photo 3

AIR CLEANER MAINTENANCE

1. Loosen the screw and remove the air cleaner from carburetor. (a-1)
2. Disassemble the air cleaner cover and body.
3. Remove the air cleaner element and screen. Install the new one. (a-2)
4. Assemble the air cleaner body and cover and re-attach to the carburetor with screw.

(Photo 4,5)

Photo 4

Photo 5

FIG-02. Vehicle Inspection

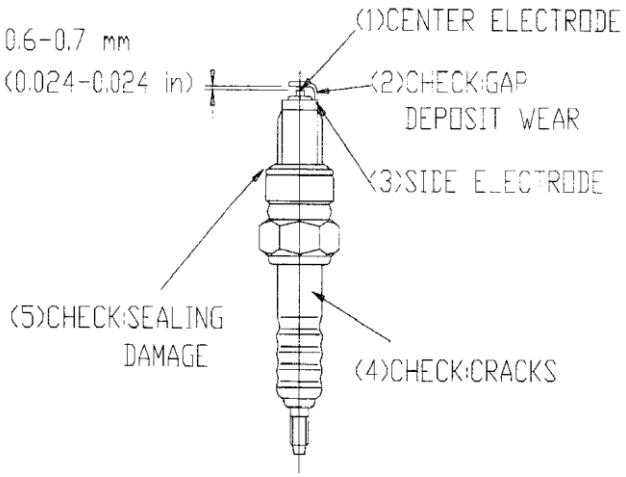
SPARK PLUG

The spark plug is located at the front of the engine.

1. Disconnect the spark plug cap and remove the spark plug (a-1)
2. Visually inspect the spark plug electrode for wear or cranks in insulator. Replace if needed
3. The center electrode should have square edges and the side electrode should have a constant thickness.
4. Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped.
5. Measure the gap with a wire-type feeler gauge and adjust if necessary by carefully bending the side electrode.
6. Check the sealing washer and replace with a new one if damaged.
7. With the sealing washer attached thread the spark plug in by hand to prevent cross threading. Tighten the spark plug. TORQUE: 12-19 N-m

SPARK PLUG GAP: 0.6~0.7 mm
RECOMMENDED REPLACEMENT PLUG:
NGK CR7HSA
(Photo 6)

Photo 6



IDLE SPEED SETTING

1. Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications. The engine must be warm for accurate idle speed inspection and adjustment.
2. Warm up the engine for about ten minutes and connect a tachometer.
3. Turn the throttle stop screw as required to obtain the specified idle speed. (a-1)

IDLE SPEED: 1700 ± 100 rpm
(Photo 7)

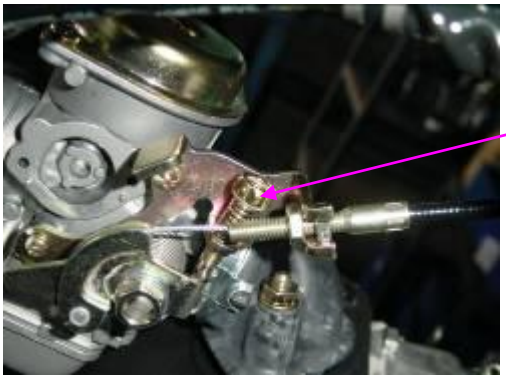
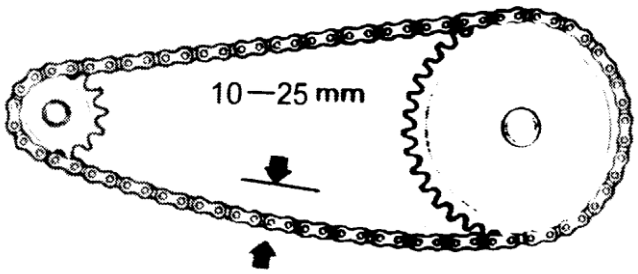


Photo 7

FIG-02. Vehicle Inspection



DRIVE CHAIN ADJUSTMENT

Stop ATV and shift transmission into neutral. Inspect the chain slack midway between the sprockets. The standard is 10-25 mm (5/8-1 inch).

If needed remove the chain protectives cover and adjust the chain slack. (a-1)
(Photo 8)

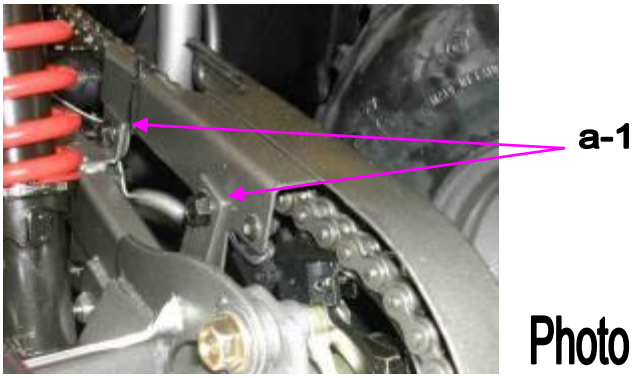


Photo 8

Loosen the axle holder lock nut then adjust the drive chain slack by turning the adjusting nut. Tighten the axle holder lock nut. (a-1)
Torque = 90N.m (65 Ft. lbs)
(Photo 9)

When the drive chain becomes very dirty, it should be removed, cleaned and lubricated with the specified lubricant.
1. Clean the drive chain with kerosene and wipe it dry
2. Inspect the drive chain for possible wear or damage.
3. Replace the chain, if it is worn excessively or damaged.
4. Inspect the sprocket teeth, if it has excessive wear or damage, replace if needed.
5.Use a commercial chain lubricant to lubricate the drive chain, replace and adjust the slack as described above. (a-1)
(Photo 10)

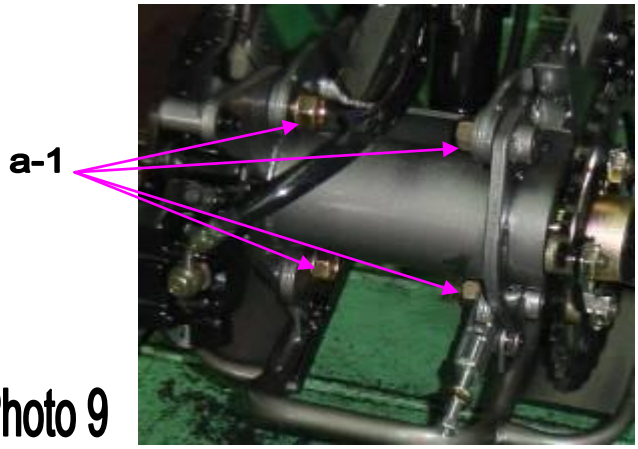


Photo 9

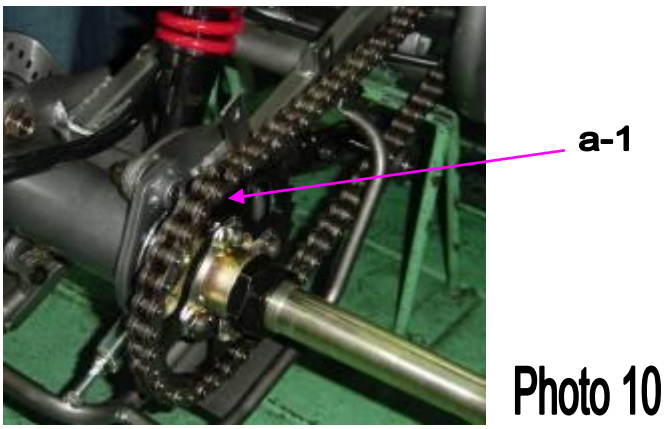


Photo 10

FIG-02. Vehicle Inspection

FRONT BRAKE ADJUSTMANT

The front brake has two cables to control right and left side brake simultaneously.
You could adjust the gap of the front brake (a-1).
(Photo 11)

Photo 11

Loosen the fix nut (a-1) and adjust the position of cable to proper situation.
(Photo 12)

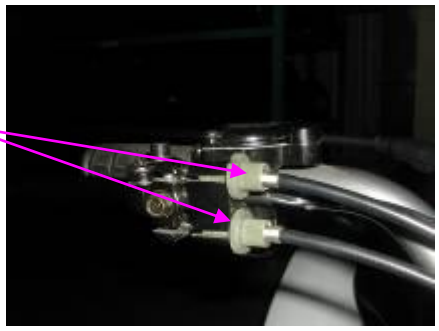


Photo 12

Inspect the front brake lever and cable for excessive play or other damage.
Replace or repair if necessary.
Measure the free play of the brake lever at the end of the lever. The standard is 10~20 mm.
Adjust the free play of the front brake lever by turning the adjuster on the brake lever assembly.

The brake shoe uses an arrowhead on the front brake plate to indicate pad condition.
When the arrowhead is beyond the wear limits shown, the brake shoes need to be changed. (a-1)
(Photo 14)

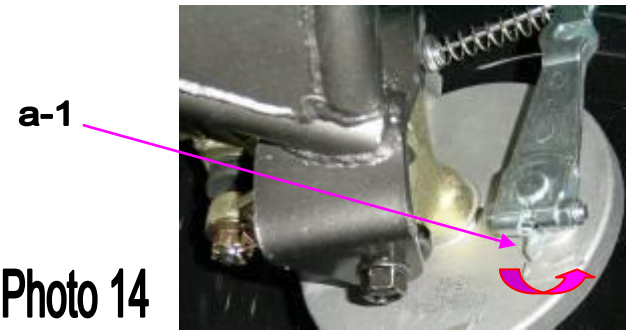


Photo 14

REAR BRAKE ADJUSTMENT

Install the rear brake cable fixing nut set & adjust the brake cable.
1. Spin the gap adjuster on the left lever to the shortest position. (a-1)
2. Adjust the adjusting screw and keep the gap within 2-3 mm. (a-2)
(Photo 15,16)

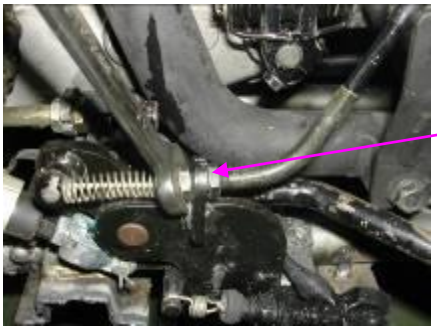


Photo 15

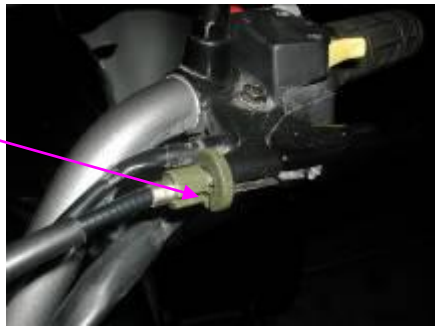


Photo 16

FIG-02. Vehicle Inspection

REAR BRAKE ADJUSTMENT

Remove the rear brake locking nut set and the brake cylinder mounting bolts (a-1)
(Photo 17)

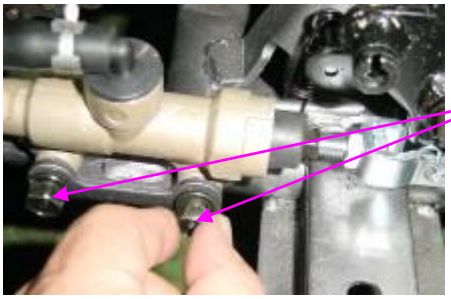


Photo 17

The setup of the adjusting nut of the brake pump(a-1):

1. The brake pedal should be in the highest location with the returning spring functioning correctly.
2. The adjusting nut changes the distance between the brake master cylinder and the hydraulic cylinder-driving rod. Make sure the nut touches the surface of the rod and revolve back 1 turn (360˚). Confirm the nut location and spin the rod until the nut is locked (a-2).

(Photo 18,19)

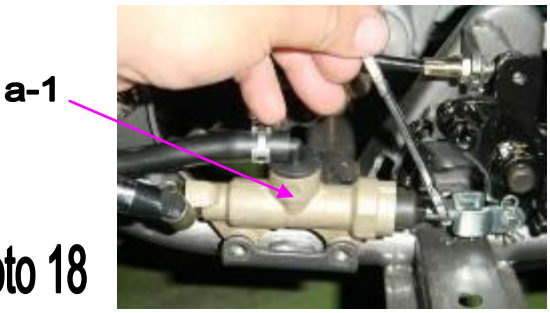


Photo 18

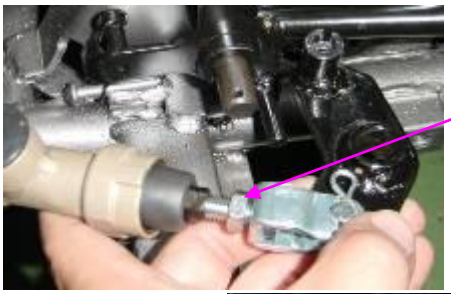


Photo 19

NOTICE:
Do not over-adjust, it might result in the brake pump malfunction and cause the brake to activate.

1. Remove any air in the brake line to prevent the brake from losing power(a-1).
2. Open the brake oil tank (a-2) and loosen the drain screw of the brake caliper without pumping the brake. In normal operation the brake oil could drain automatically; please try this for couple times for confirmation. If it doesn't work, adjustment of the brake pump may be required.

(Photo 20,21)

Photo 20

Photo 21

NOTICE:
Verify oil amount is above the minimum level.

Press on the brake pedal or pull the brake lever several times then hold pressure, release the drain screw and lock it on immediately until no air bubbles are found in the brake oil.
Be careful for splashing oil when bleeding the brakes.

FIG-02. Vehicle Inspection

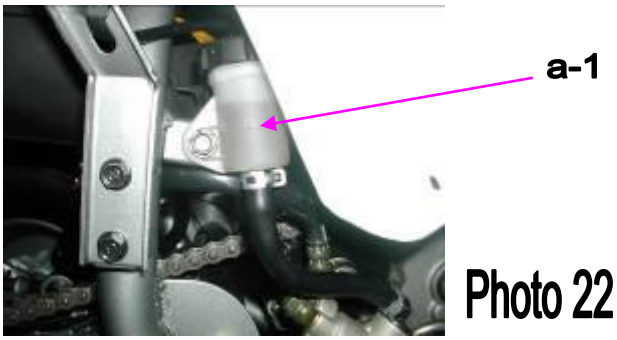


Photo 22

REAR BRAKE FLUID REFILLING METHOD

1. Remove the oil tank cover (a-1).
2. Refill with the recommended DOT-3 brake fluid until the level reaches the upper limit.
(Photo 22)

CAUTION

Be careful when filling the brake oil tank to
to avoid spilling the oil

FIG-02. Vehicle Inspection

FRONT SUSPENSION

1. Check the R. and L. side suspension, the front suspension should be adjusted to the same preload (a-1).
2. Inspect the shocks for oil leakage; if any is present, replace shocks.
3. Check the welding of frame bracket, which is connected to front suspension.
4. Also, check the swing arm for cracks or dents (a-2). (Photo 23)

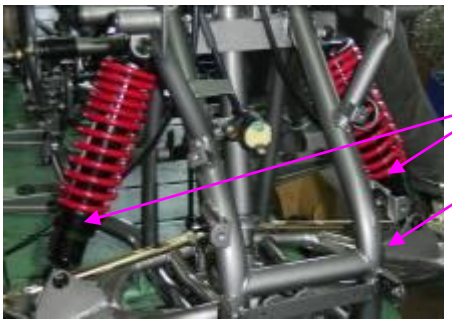


Photo 23

REAR SUSPENSION

1. Check the rear suspension for proper spring preload (a-1). Inspect the shock for oil leakage; if any is present, replace shock
2. Check the welding of frame bracket that connects with rear shock and the condition of swing arm. (Photo 24)

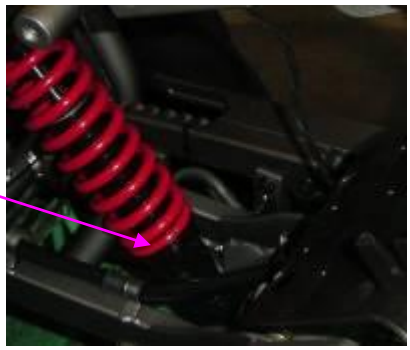


Photo 24

MANUAL CHOKE CABLE

There is an adjustment screw under the master cylinder to control the amount of choke opening for proper starting (a-1).
(Photo 25)

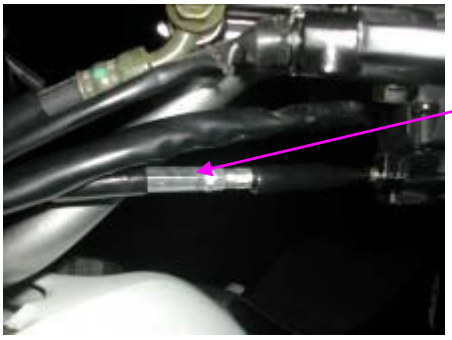


Photo 25

WHEELS AND TIRES

Inspect the tire surface for cuts, nails or other sharp objects. (a-1).
Check the tire pressure at cold tire conditions.
The standard tire pressure is 3psi. (0.15kgf/cm^2)
(Photo 26)

Photo 26

FIG-02. Vehicle Inspection

STEERING SYSTEM

Check the free play of the steering shaft with the front wheels turned straight ahead. When there is excessive play, inspect the tie-rod, kingpin bushing and ball joint. (a-1).

(Photo 27)

Photo 27

STEERING SHAFT HOLDER BUSHING

Remove the front fender.

Remove the steering shaft holder and check the steering shaft bushing for wear or damage.

If the bushing is worn or damaged, replace the bushing.

Grease the steering shaft bushing and install the parts in the reverse order of removal. (a-1)

(Photo 28)

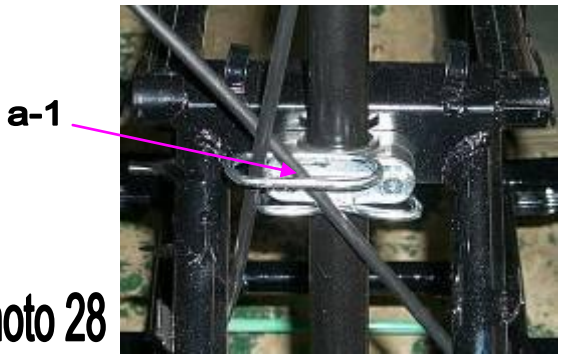


Photo 28

Torque: steering shaft holder bolt: 33N.m (24 Ft. lbs)

TOE-IN

Park the vehicle on level ground with the front wheels facing straight ahead.

Mark the centers of the tires to indicate the axle center height.

Measure the distance between the marks.

Carefully move the vehicle back, let the wheels turn 180° so the marks on the tires are aligned with the axle center height.

(Photo 29)

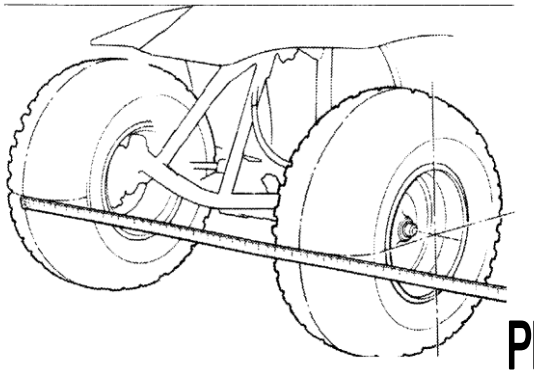


Photo 29

Measure the distance between the marks.

Calculate the difference in the front and rear measurements.

(Photo 30)

Toe-in: 5±10 mm

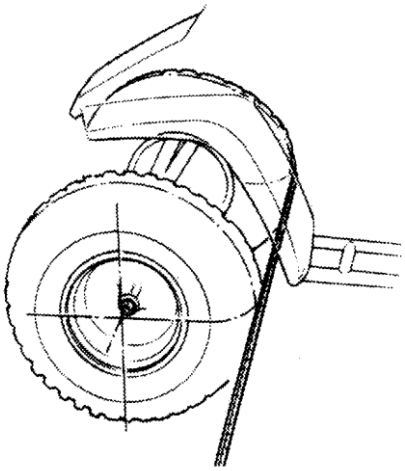


Photo 30

If the toe-in is out of standard, adjust it by changing the length of the tie-rods equally by turning the tie-rod while holding the ball joint.

Tighten the lock nuts (a-1)

Torque: 35-43 N.m

(Photo 31)

Photo 31

FIG-02. Vehicle Inspection

GEAR OIL MAINTENANCE

Gear oil needs to be changed every 200 hours.
There is a gear oil drain hole bolt at the rear of the engine.
1. Unscrew this drain hole bolt and let the dirty oil flow out, catching the oil in a proper container for later disposal.
2. Reinstall the drain hole bolt and tighten.
3. Fill with new gear oil through the oil fill hole located on the engine case beside the gearbox.
(Photo 32)

Photo 32

LUBRICATE

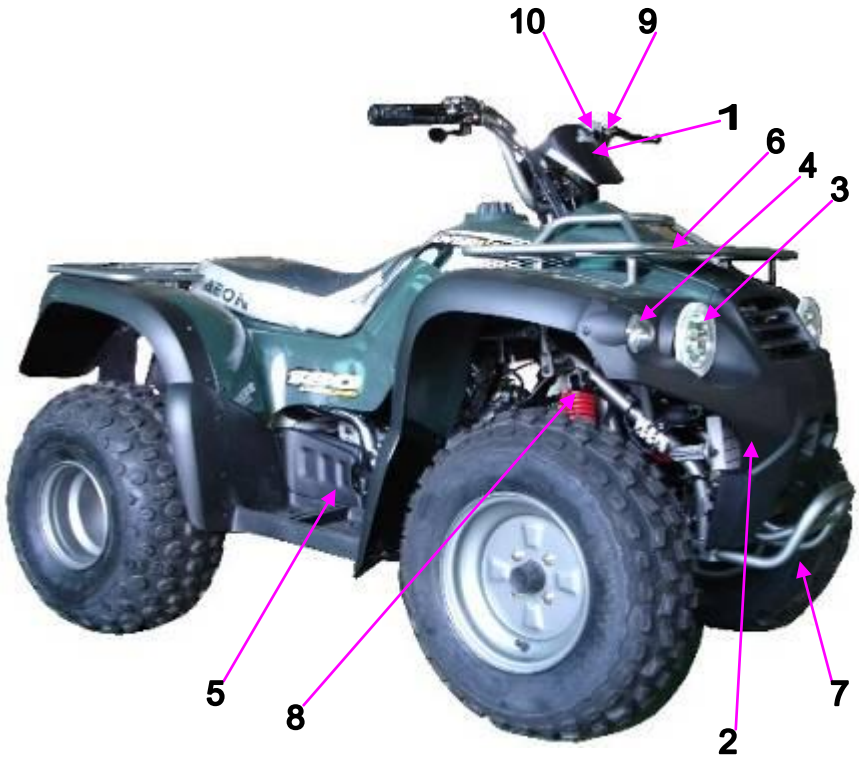
There is a grease valve on the R. and L. suspension arm and swing arm sub ass'y (a-1).
Please lubricate the grease frequently on the grease valve.
(Photo 33)

Photo 33

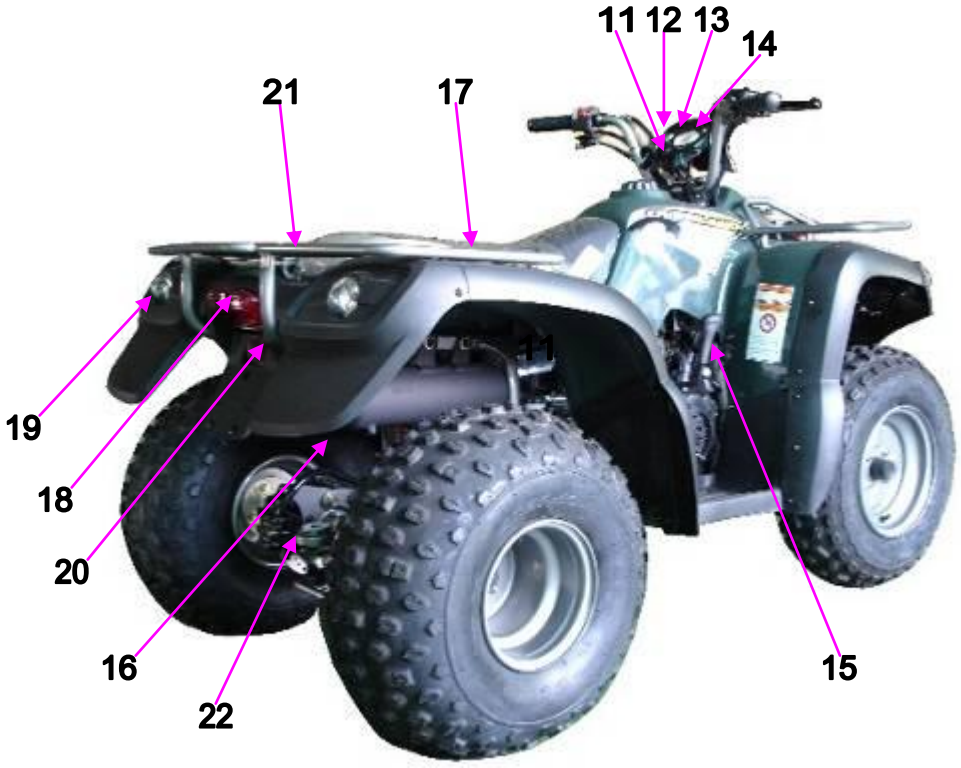
MEMO

FIG-03. Overview

Parts Description



01. HANDLE BAR COVER
02. FRONT FENDER CARRIERS
03. HEAD LIGHT ASS'Y
04. POSITION LIGHT ASS'Y
05. MASTER CYLINDER SUB(L)
06. FRONT METAL RACK
07. BUMPER
08. FRONT SUSPENSION
09. RIGHT LEVER ASS'Y
(Including parking brake)
10. L. SWITCH ASS'Y



11. MAIN SWITCH ASS'Y
12. NEUTRAL INDICATOR
13. REVERSE INDICATOR
14. FUEL GAUGE ASS'Y
15. TRANSMISSION LEVER
16. REAR SUSPENSION
17. SEAT
18. TAIL LIGHT ASS'Y
19. REVERSE LIGHTS
20. REFLECTOR
21. REAR METAL RACK
22. TRAILER HITCH MOUNT

FIG-04. Fender

BUMPER

Loosen the bolts (a-1) and Remove the bumper (a-2) from the frame body

(Photo 1)

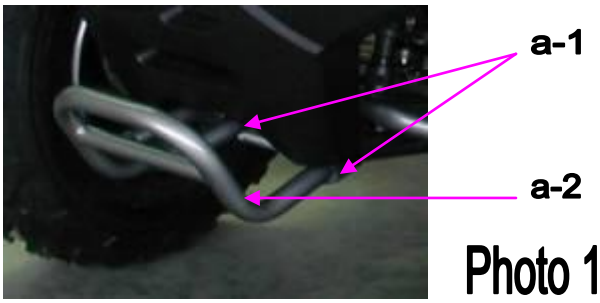


Photo 1

FRONT METAL RACK

Loosen the bolts (a-1)

and Remove the front metal rack (a-2) from the frame body

(Photo 2)

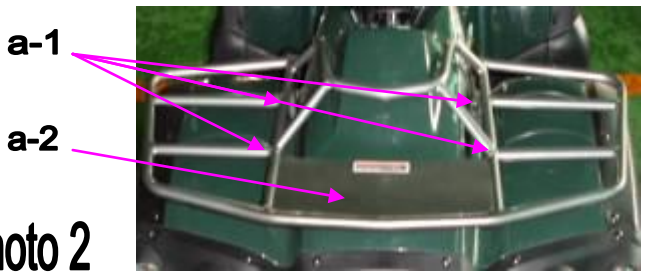


Photo 2

REAR METAL RACK

Loosen the screws (a-1)

Loosen the bolts (a-3)

Remove the rear rack bracket (a-2)

Loosen the bolts (a-3)

Remove the rear metal rack (a-4)

(Photo 3)

Photo 3

Note:

Refer to the preceding disassembly instructions for re-assembly.

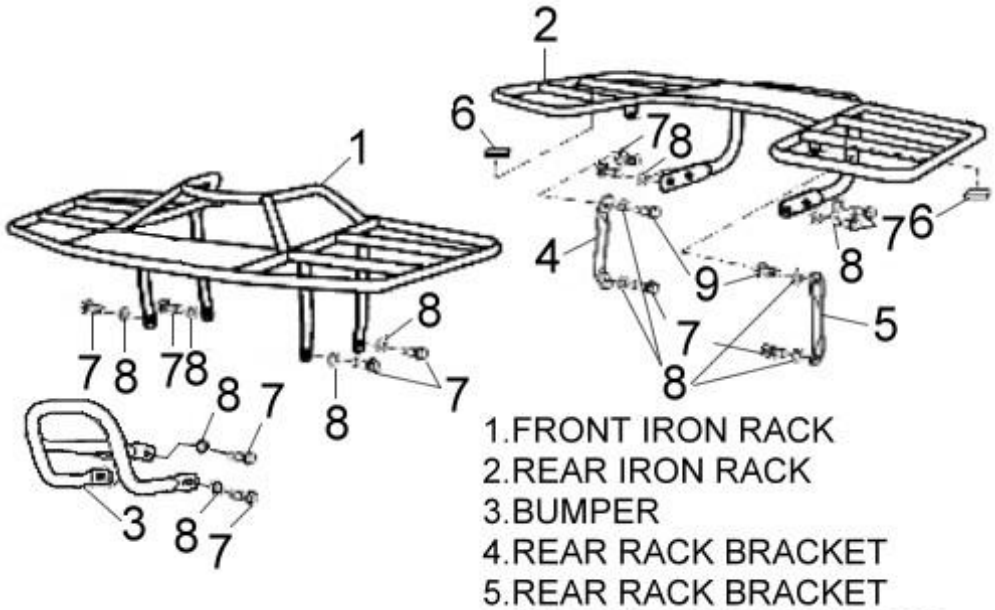


FIG-04. Fender

FRONT FENDER COVER

Loosen the screws (a-1)

Remove the front fender cover (a-2)

(Photo 4)

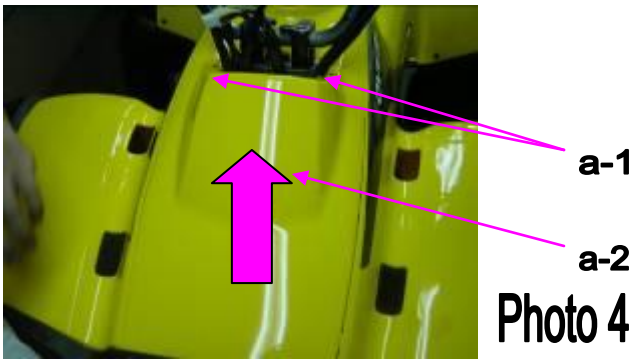


Photo 4

BUMPER COVER

Loosen the screws (a-1)

Loosen the screws (a-2)

Take off the main wire connect with the lights wire (a-3)

Remove the front fender cover (a-4)

(Photo 5)

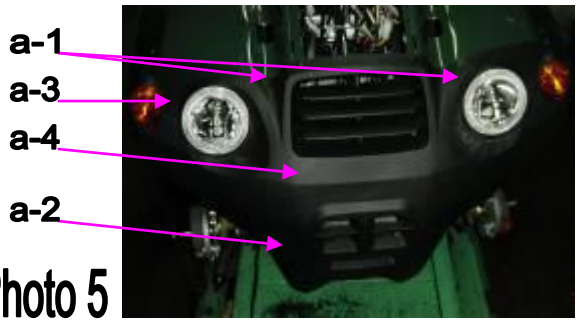


Photo 5

LICENSE PLATE

Loosen the screws (a-1)

Loosen the screws (a-2)

Take off the main wire connect with the lights wire (a-3)

Remove the license plate (a-4)

(Photo 6)

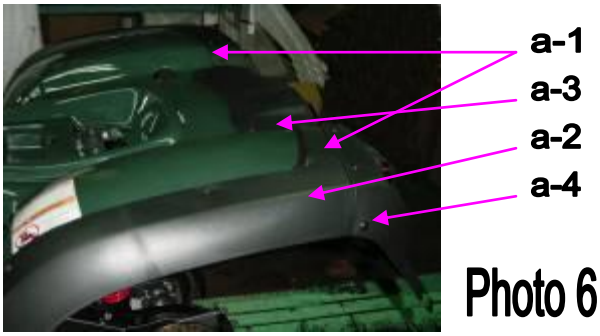


Photo 6

SEAT ASS'Y

Pull the “Seat Release Bar” to take off the seat. (a-1)

This seat release bar is under the right side of the rear fender. Remove the seat ass’y

(Photo 7)

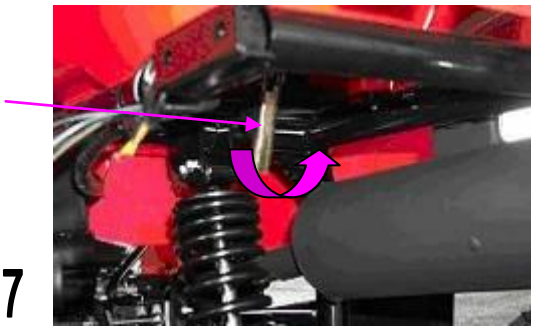


Photo 7

FRONT FENDER

Loosen the screws (a-1)

Loosen the hex bolt with plain washer (a-2)

Take off the fuel tank cap

Remove the front fender (a-4)

(Photo 8)

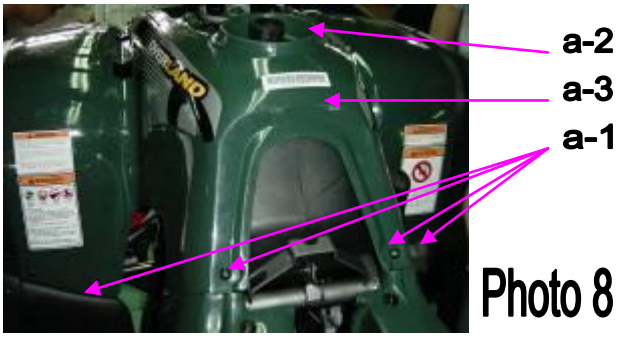


Photo 8

FRONT FENDER

Loosen the screws (a-1)

Loosen the hex bolt with plain washer (a-2)

Remove the front fender (a-3)

(Photo 8)

Photo 9

CAUTION

1. The battery and the toolbox are put under the seat.

FIG-04. Fender

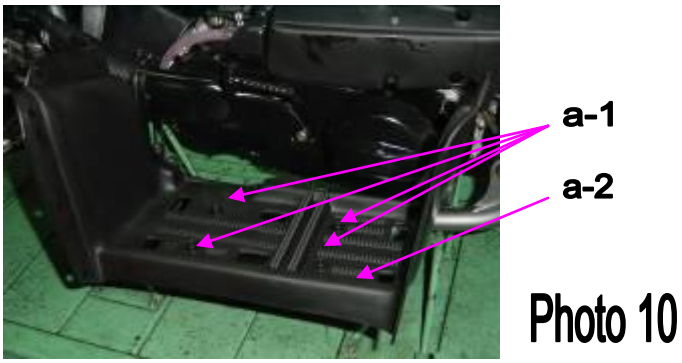


Photo 10

FOOTREST

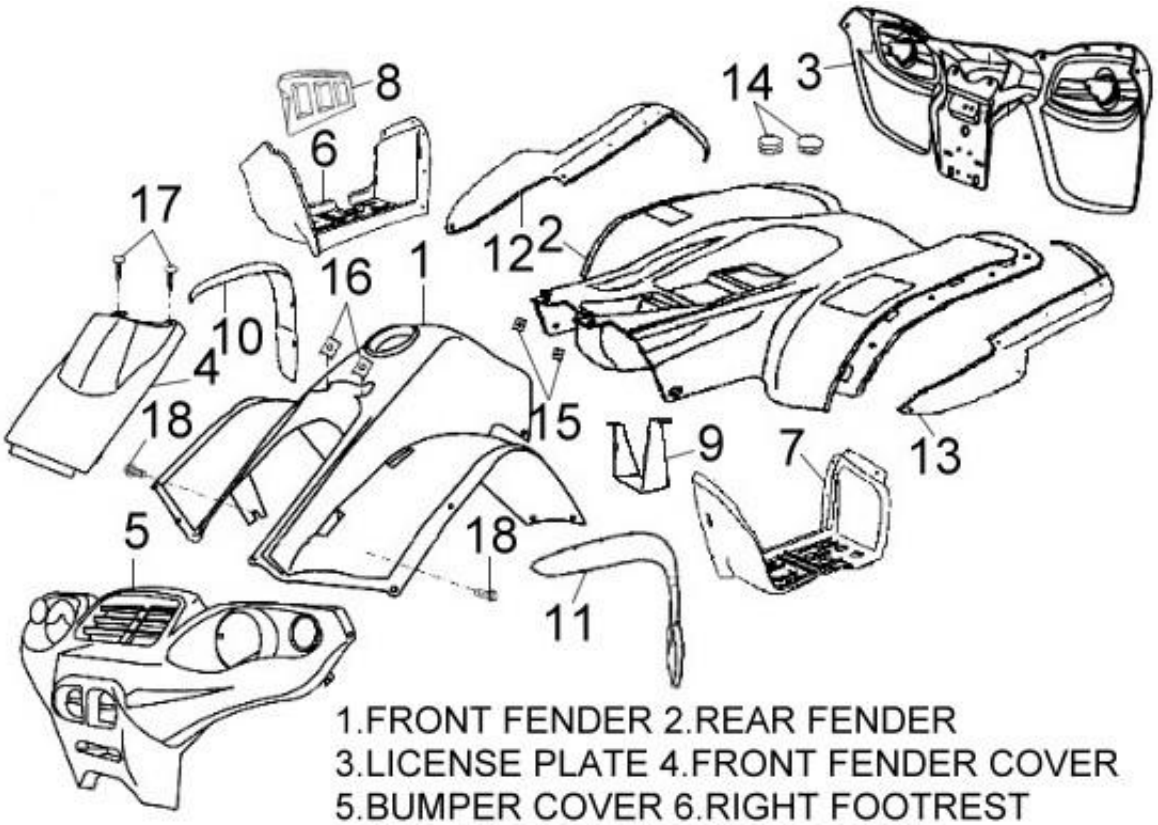
Loosen the bolts (a-1)

Remove the footrest ass'y (a-2)

(Photo 10)

Note:

Refer to the preceding disassembly instructions for re-assembly.



1.FRONT FENDER 2.REAR FENDER
3.LICENSE PLATE 4.FRONT FENDER COVER
5.BUMPER COVER 6.RIGHT FOOTREST
7.LEFT FOOTREST 8.HEAT SHIELD
9.BATTERY BRACKET 10.FRONT RH. MUDFLAP
11.FRONT LH. MUDFLAP 12.REAR RH. MUDFLAP
13.REAR LH. MUDFLAP 14.BATTERY RUBBER
15.U PLATE NUT 16.U PLATE NUT
17.TAPPING SCREW 18.HEX BOLT WITH FIX WASHER

FIG-05. Fuel & Oil Tank

FUEL TANK

Loosen the bolts (a-1)

Take off the main wire connect with the fuel gauge wire (a-2)

Loosen the bolts (a-3)

Remove the petcock ass'y, vacuum shut-off (a-4)

Remove the fuel tube (a-5) with the fuel filter ass'y(a-6)

Remove the air tube (a-7)

Remove the fuel tank (a-8) leave the frame body (Photo 11,12)

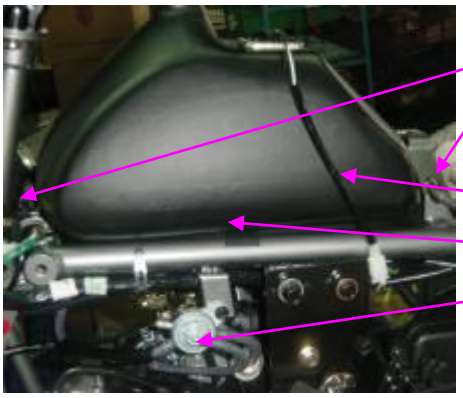


Photo 11

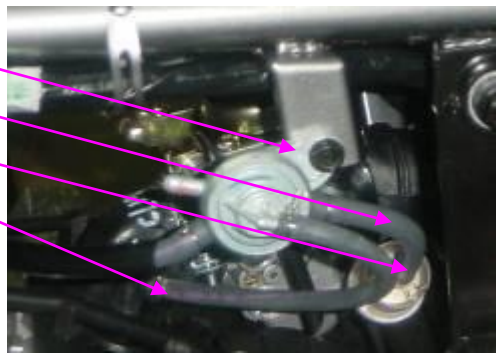


Photo 12

CAUTION

1. There are rubbers on the frame body to reduce the vibration and to protect the fuel tank.
2. There is a breather tube in the fuel cap.

Note:

Refer to the preceding disassembly instructions for re-assembly.

FIG-06. Muffler

MUFFLER

Loosen the bolts (a-1) and make it connected to the cylinder (a-2).
(Photo 13)

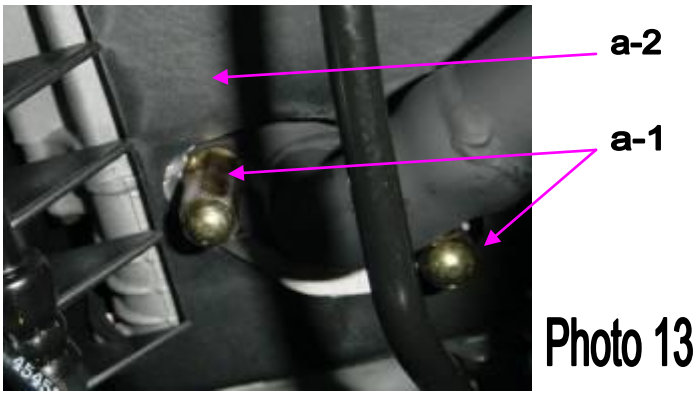


Photo 13

CAUTION

1. The muffler is hot during operation.
2. Do not touch the muffler or the heat shields.
3. Please check the gasket of muffler before mounting the muffler.

Loosen the bolts (a-1) of the muffler (a-2)
on the frame body (a-3).
(Photo 14)

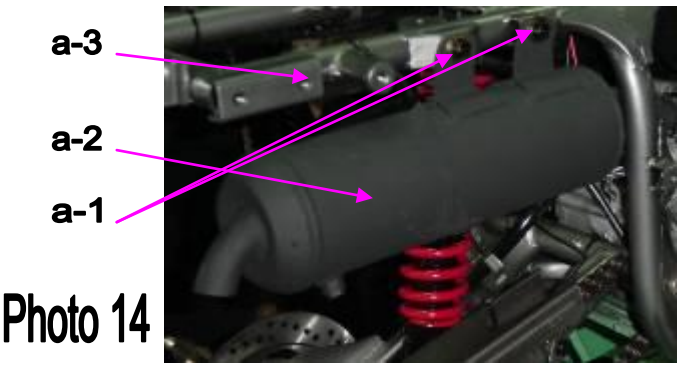


Photo 14

Note:

Refer to the preceding disassembly instructions for re-assembly**.**

FIG-07. HANDLEBAR

HANDLE BAR COVER

Loosen the screws (a-1)

Remove the head light cover (a-2)

Take off the main wire connect with the head light wire (Photo 15)

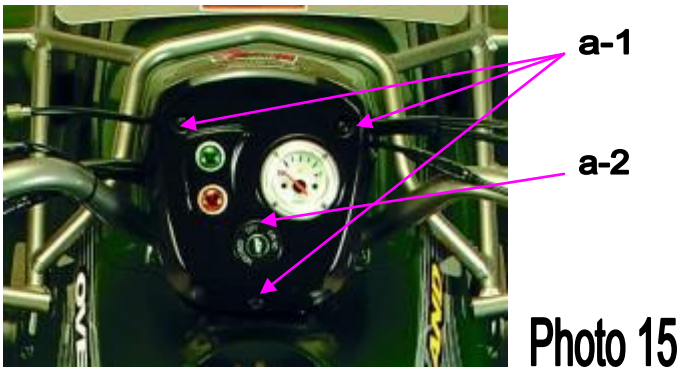


Photo 15

Remove the fuel gauge ass'y (a-1)

Loosen the nut remove the neutral indicator (a-2)

Loosen the nut remove the reverse indicator (a-3)

Remove the main switch clip and take off the main switch (a-4)

(Photo 16)

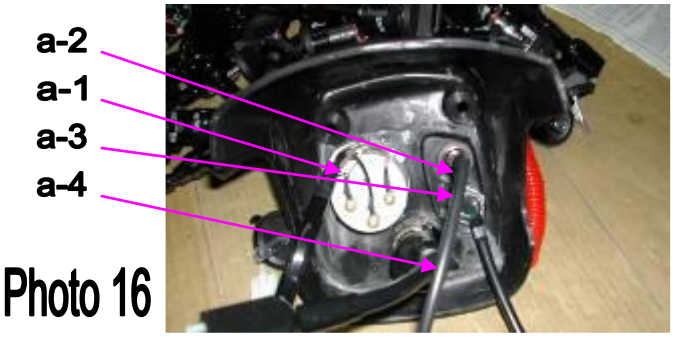


Photo 16

Loosen the bolts (a-1)

Remove the protect cover mounting plate (a-2)

(Photo 17)

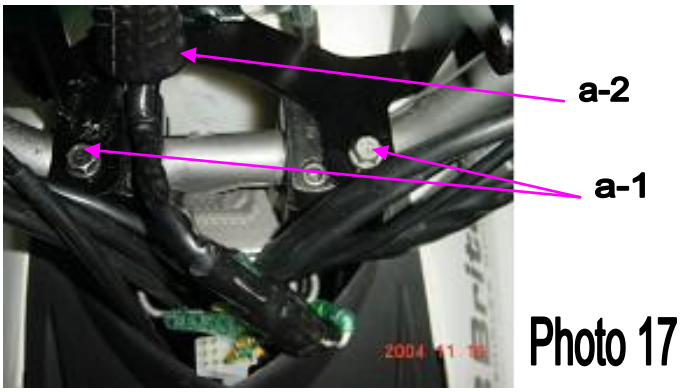


Photo 17

FIG-07. HANDLEBAR

REAR BRAKE CABLE

Remove the rear brake cable (a-1)
(Photo 18)

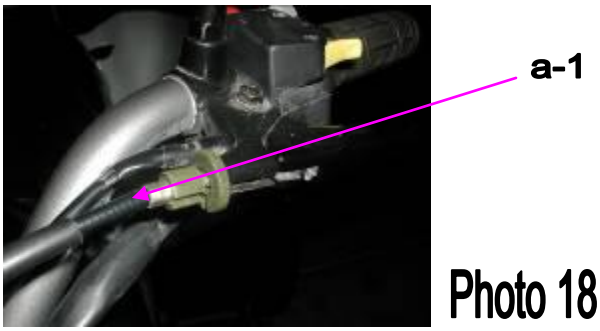


Photo 18

FRONT BRAKE CABLE

Remove the R. and L. front brake cable (a-1)
(Photo 19)

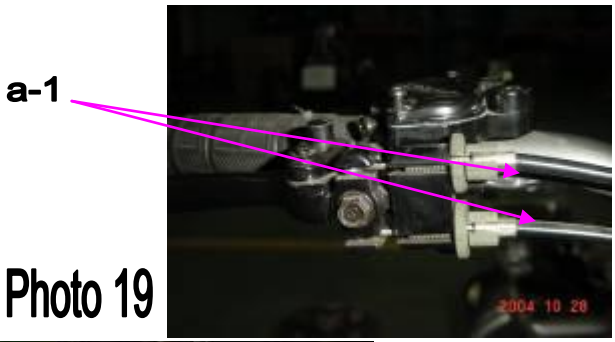


Photo 19

THROTTLE CABLE

Right lever ass'y loosen the screws (a-1)
open the cover and mount the throttle cable (a-2)
in the box
(Photo 20)

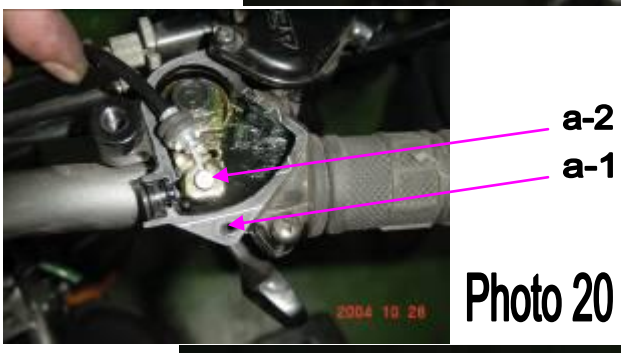


Photo 20

CAUTION

1. Smear grease on the throttle wire before mounting it in the throttle box.
2. There is a park brake on the R. level.
3. It is design for safety assurance. When the vehicle stopped on the slope ground, please operate the park brake.

MANUAL CHOKE WIRE

Remove the manual choke wire on the L. Switch (a-1)
(Photo 21)

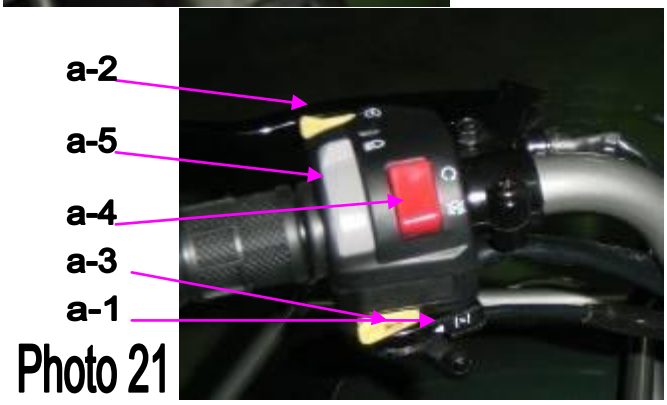


Photo 21

The L. Switch includes the engine start switch (a-2),
Horn switch (a-3)
Engine stop switch (a-4),
Headlight (high/low beam) switch (a-5).
(Photo 21)

HANDLE BAR CLAMP COVER

Loosen the bolts (a-1)
Remove the handle bar ass'y (a-2)
(Photo 22)

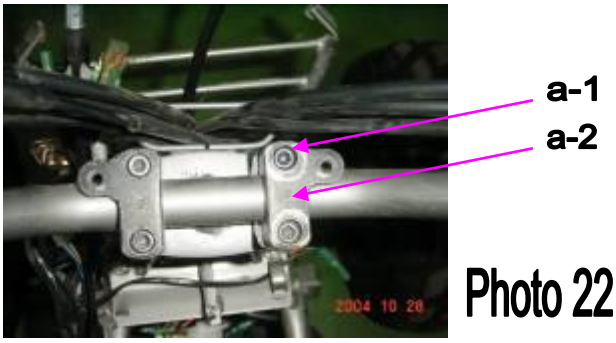


Photo 22

Note:

Refer to the preceding disassembly instructions for re-assembly.

FIG-08. Engine Disassembly

DRIVE CHAIN ASS'Y

Take off the chain master link set (a-1)

Remove the drive chain (a-2)

(Photo 23)

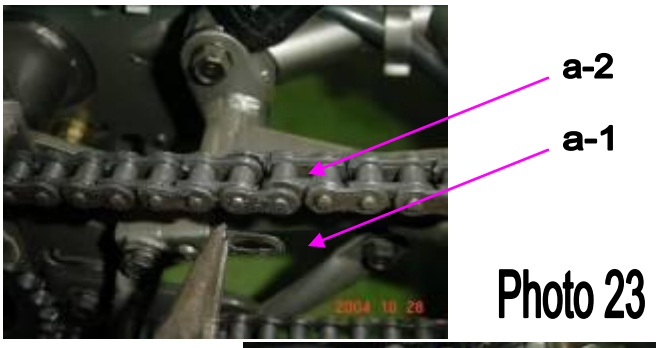


Photo 23

TRANSMISSION ASS'Y

Loosen the bolts (a-1)

Remove the shifter plate (a-2) with the reverse cut-out switch and reverse indicator switch

Remove the transmission lever (a-3)

Remove the transmission fork link (a-4)

(Photo 24)

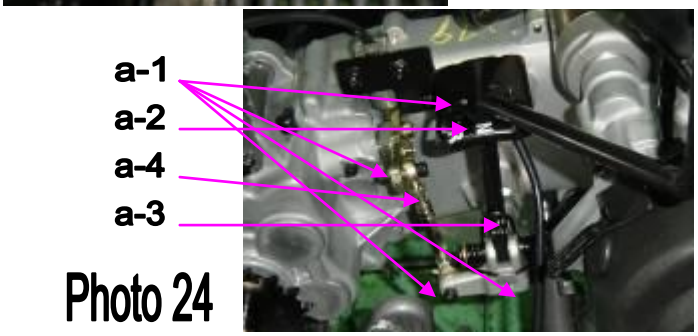


Photo 24

RADIATOR

Loosen the bolts (a-1) on the frame body.

Loosen the bolts (a-2) on the oil hose outlet.

Remove the radiator (a-3)

(Photo 25)

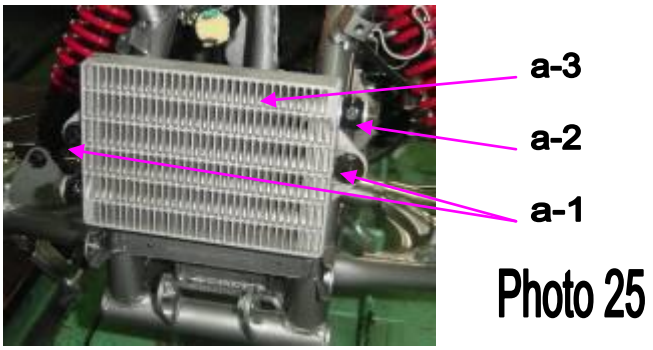


Photo 25

WIRE

Take off the main wire connect with the generator ass'y wire (a-1) and starting motor ass'y wire (a-2)

(Photo 26)

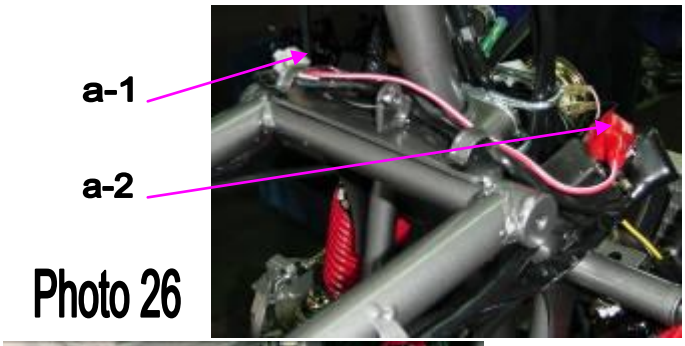


Photo 26

ENGINE

Loosen the front bolts (a-1)

Loosen the rear bolts (a-2)

Remove the engine bracket plate (a-3)

Remove the engine (a-4)

(Photo 27)

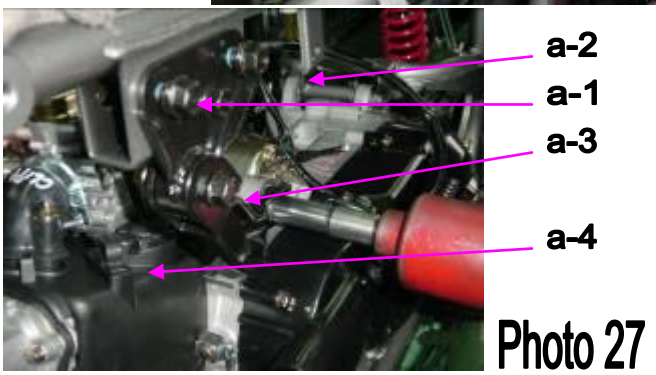


Photo 27

Note:

The detailed Engine disassembling to refer to FIG-18

Refer to the preceding disassembly instructions for re-assembly.

FIG-09. Tire and Rim

FRONT WHEEL ASS'Y

Take off the rubber cap (a-1) and cotter pin (a-2)
Loosen the insert lock nut (a-3)
Remove the washer (a-4) and plain washer (a-5)
(Photo 28,29)

Photo 28

FRONT WHEEL ASS'Y

Loosen the bolts (a-1)
Remove the wheel tire (a-2) and rim (a-3)
Remove the front brake drum (a-4)
(Photo 30)

Photo 29

FRONT TIRE SPECIFICATIONS

Front tire -- 21*7.0-10"

REAR WHEEL ASS'Y

Take off the rubber cap (a-1) and cotter pin (a-2)
Loosen the insert lock nut (a-3)
Remove the washer (a-4) and plain washer (a-5)
(Photo 31,32)

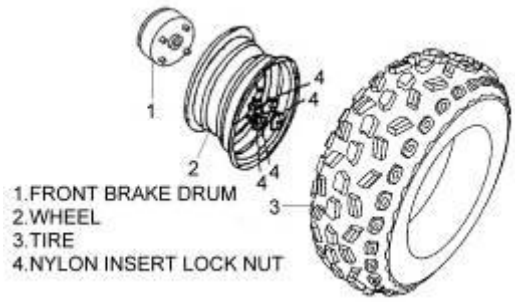


Photo 30

REAR WHEEL ASS'Y

Loosen the nylon insert lock nuts (a-1)
Remove the wheel tire (a-2) and rim (a-3)
Remove the shaft connecter (a-4)
(Photo 33)

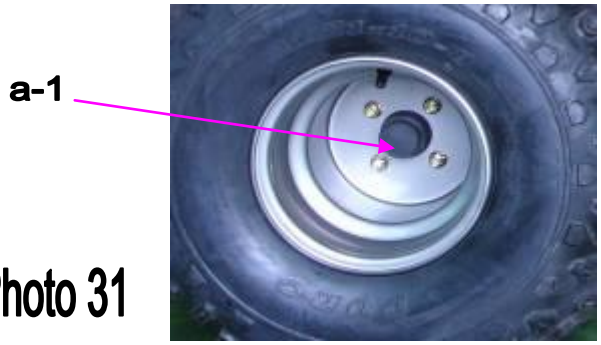


Photo 31

REAR TIRE SPECIFICATIONS

Rear tire -- 21*10. 0-8"

CAUTION

1. When the cotter pin is damaged, it must be changed to a new one.
2. The tire has a tread arrow, when assembled the arrow must point to the front

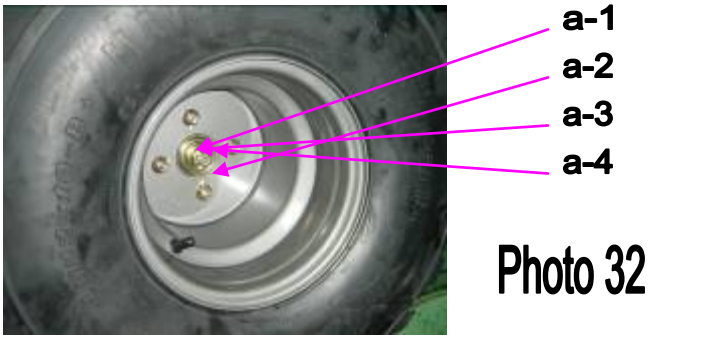


Photo 32

Note:

Refer to the preceding disassembly instructions for re-assembly.

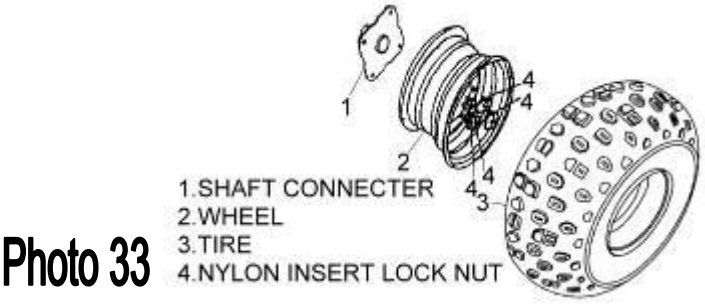


Photo 33

FIG-10. Front Brake

BRAKE SYSTEM

Brake Parts & Location

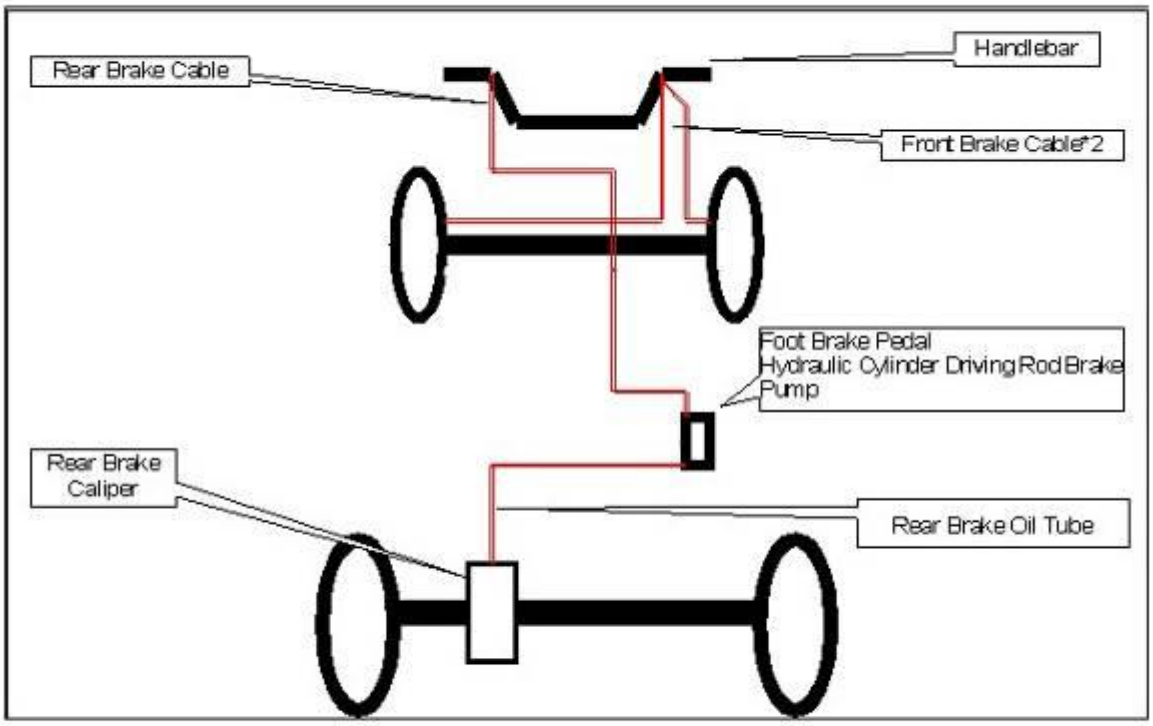


FIG-10. Front Brake

FRONT BRAKE PLATE ASS'Y

Remove the front brake cable (a-1) with the front brake arm put in the up side hole (a-2).
Remove the front brake plate ass'y (a-3)
Remove the front brake shoe comp (a-4).
(Photo 34,35)

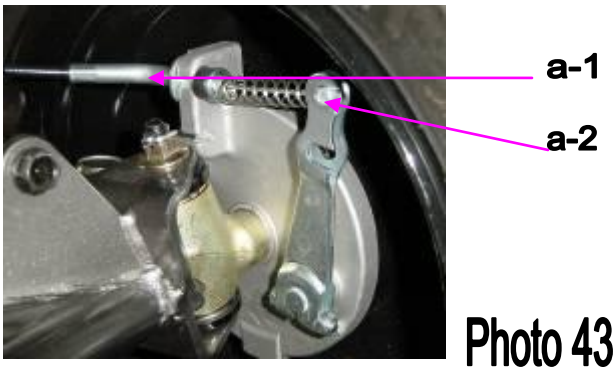


Photo 43

CAUTION

1. Brake pads must be changed when the friction material is worn out (see indicator on brake face).
2. Assemble the front brake plate ass'y on the knuckle with the fixed position.

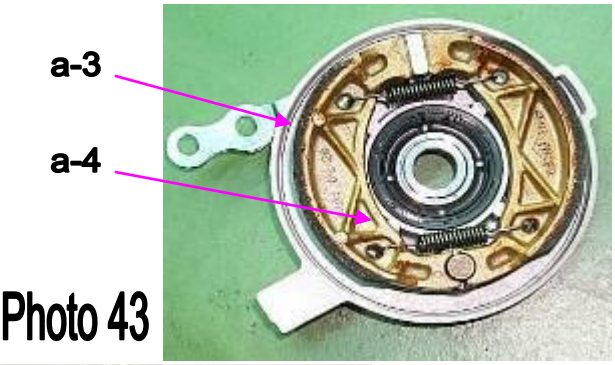


Photo 43

FRONT BRAKE DRUM

There is oil seal (a-1) front brake plate
There is bearing (a-2) on the brake drum.
Please check these parts when the brake drum is mounted or dismounted.
(Photo 36)

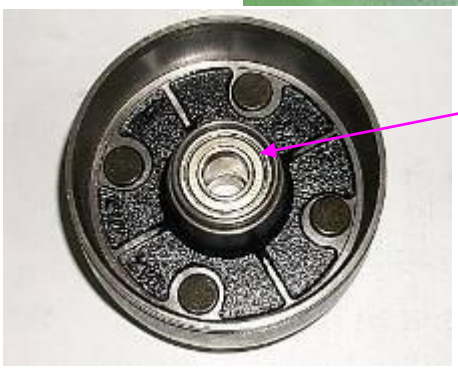


Photo 43

Note:

Refer to the preceding disassembly instructions for re-assembly.

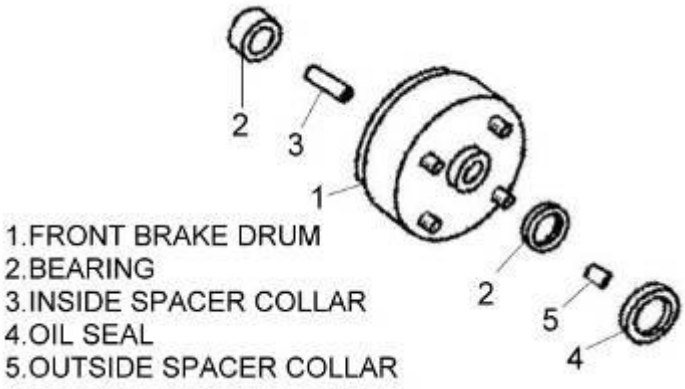


FIG-11. Rear Brake

MASTER CYLINDER SUB

Brake fluid level must be below the maximum level
Fill with fluid when the level is below the “min” line (a-1)
(Photo 37)

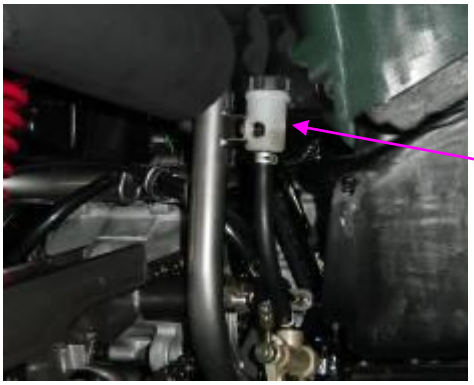


Photo 37

CALIPER ASS'Y

Check the brake pad kit, when the friction material is worn away, pads must be changed to a new set (a-1)
(Photo 38)

Loosen the bolts (a-1)
Remove the caliper ass’y (a-2)
Loosen the bolts (a-3) on the caliper
Remove the brake pad kit (a-4)
(Photo 39)

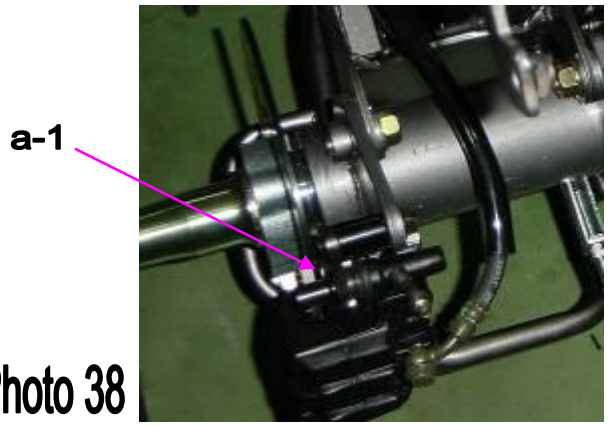


Photo 38

CAUTION

1. When changing the brake pad kit, be careful not to allow grease to touch the brake pad kit

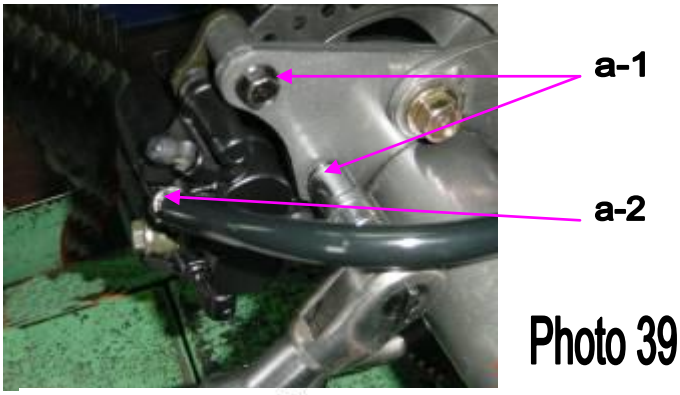


Photo 39

BRAKE HOSE

To let out the brake oil
Loosen the bolts (a-1)
Remove the brake hose (a-2) and plain washer (a-3)
(Photo 40)

CAUTION

1. When changing the brake hose, replace the plain washer if damaged.

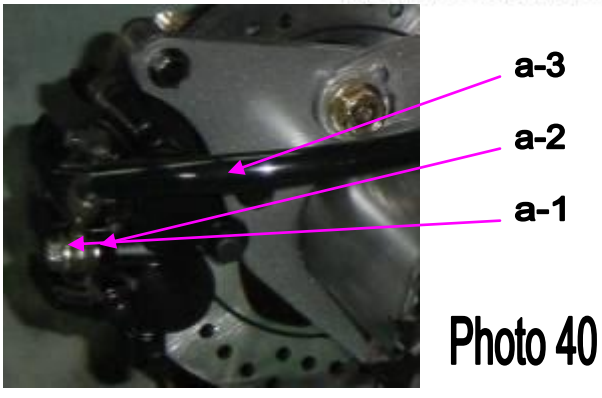


Photo 40

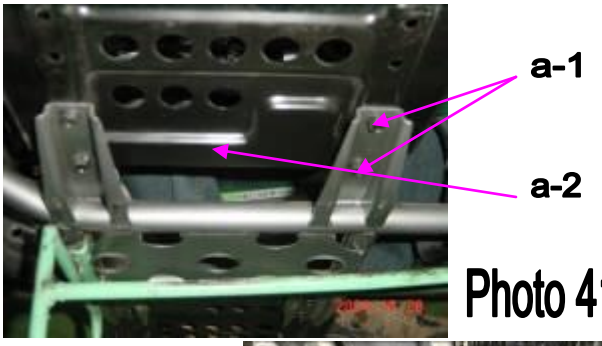
FIG-11. Rear Brake

RIGHT FOOTWELL BOTTOM BOARD

Loosen the bolts (a-1)

Remove the right footwell bottom board (a-2)

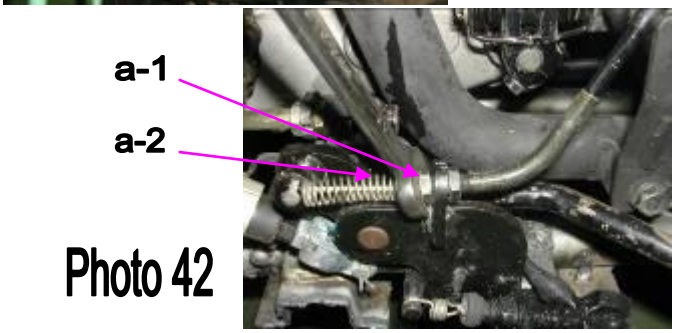
(Photo 41)



REAR BRAKE CABLE FIXED HOLDER

Loosen the nuts (a-1) on the rear brake cable (a-2)

(Photo 42)



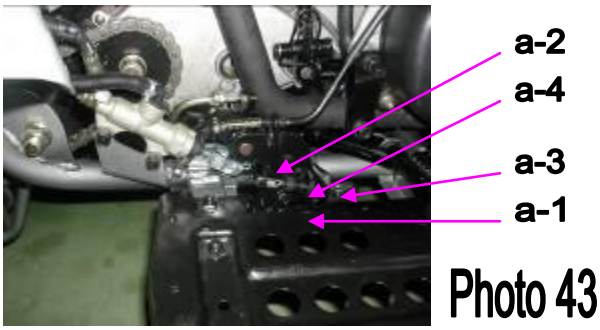
Loosen the bolts (a-1)

Remove the switch spring (a-2)

Remove the rear brake cable fixed holder (a-3)

Remove the wave washer (a-4)

(Photo 43)



HYDRAULIC CYLINDER LEVER

Loosen the bolts (a-1)

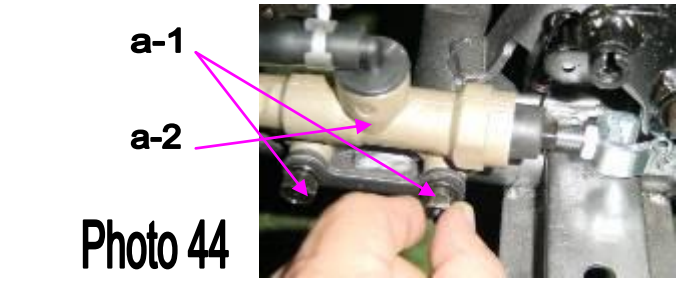
Remove the master cylinder (a-2)

Remove the hydraulic cylinder lever (a-3)

Remove the hydraulic parallel pin (a-4)

Remove the hydraulic cotter pin (a-5)

(Photo 44,45)



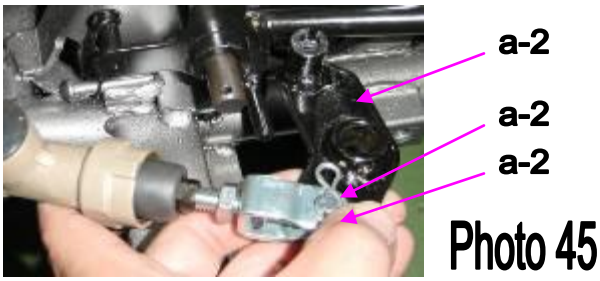
PENDANT BRAKE LEVER

Remove the spring (a-1)

Remove the front pedal brake connected cable (a-2)

Remove the pendant brake lever (a-3)

(Photo 46)



Note:

For detailed Rear brake disassembling refer to FIG-20

Refer to the preceding disassembly instructions for re-assembly.

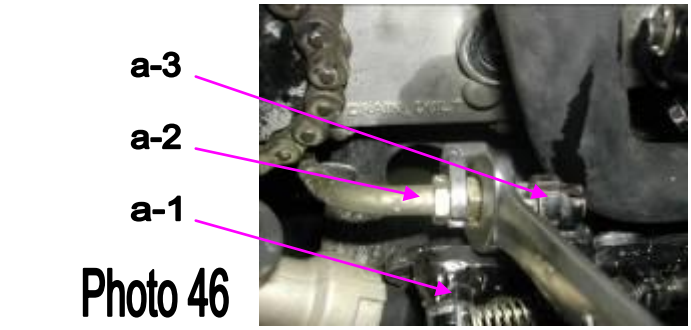


FIG-12. Suspension

FRONT SUSPENSION

The front suspension is mounted on the frame (a-1) and suspension arm (a-2).
Loosen the bolts (a-3) and nuts (a-4)
Remove the front suspension (a-5)
(Photo 47)

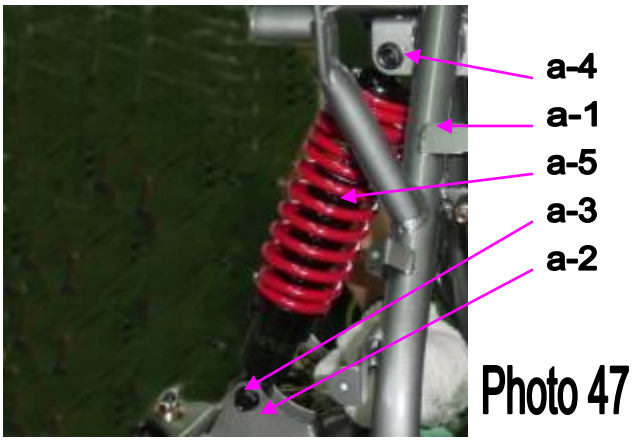


Photo 47

CAUTION

1.The front suspension of the 50cc/100cc can be adjusted to the proper damper according driver's preference.

REAR SUSPENSION

The rear suspension is mounted on the frame (a-1) and swing arm sub ass'y (a-2).
Loosen the bolts (a-3)
Remove the rear suspension (a-4)
(Photo 48)

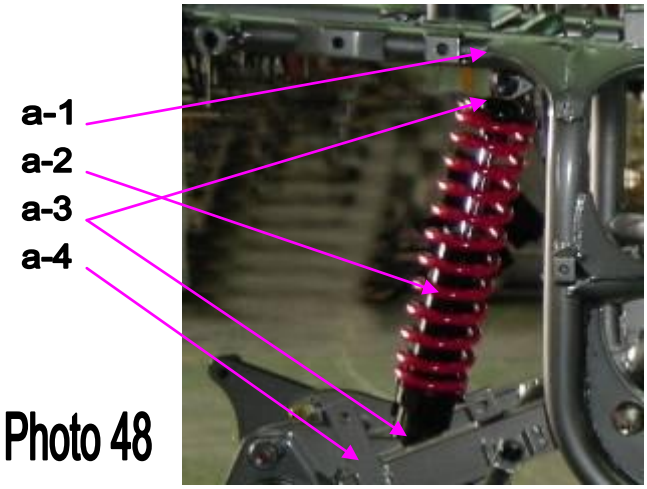


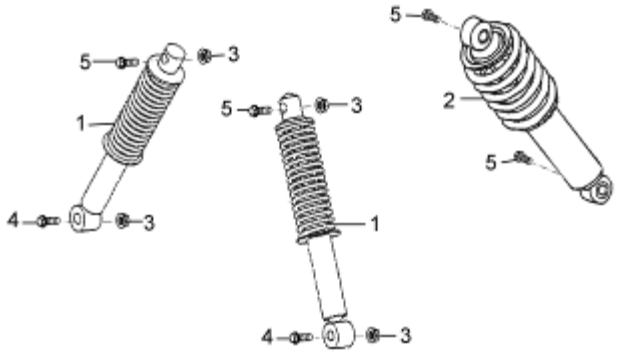
Photo 48

CAUTION

The rear suspension of the 50cc/100cc can be adjusted to the proper damper according drive's preference

Note:

Refer to the preceding disassembly instructions for re-assembly.



1 FRONT SUSPENSION
2 REAR SUSPENSION
3 HEX FLANGE NUT
4 HEX BOLT
5 HEX WASHER FACE BOLT

FIG-13. Suspension Arm

KNUCKLE

Take off the cotter pin (a-1)
Loosen the nut (a-2)
Remove the steering tie-rod ass'y (a-3)
(Photo 49)

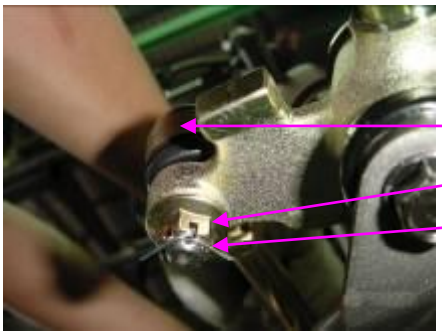


Photo 49

Take off the cotter pin (a-1)
Loosen the insert lock nut (a-2)
Remove the washer (a-3)
Remove the knuckle (a-4)
(Photo 50)

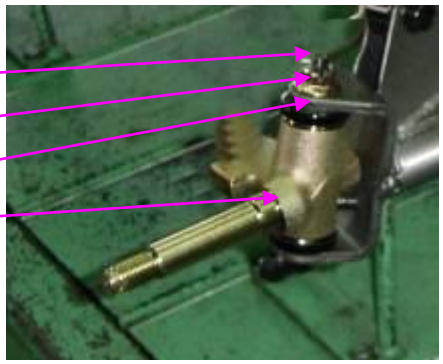


Photo 50

SUSPENSION ARM

Loosen the bolts (a-1) with the suspension (a-2)
Loosen the bolts (a-3) and nuts (a-4) with the frame body (a-5)
(Photo 51)

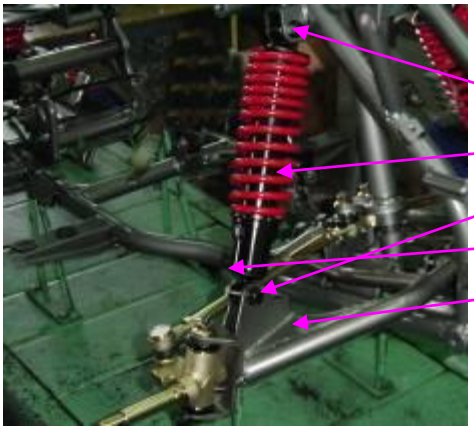


Photo 51

CAUTION

1. The suspension arm marked "R" is for the right side.
2. The suspension arm marked "L" is for the left side.
3. The knuckles are marked "R" or "L", please pay attention the differences while mounting.
4. Before mounting knuckle, please smear grease on the knuckle.
5. Mount the knuckle on the suspension arm and tighten the nut and put on the cotter pin.
6. Please check the refill grease on it frequently.

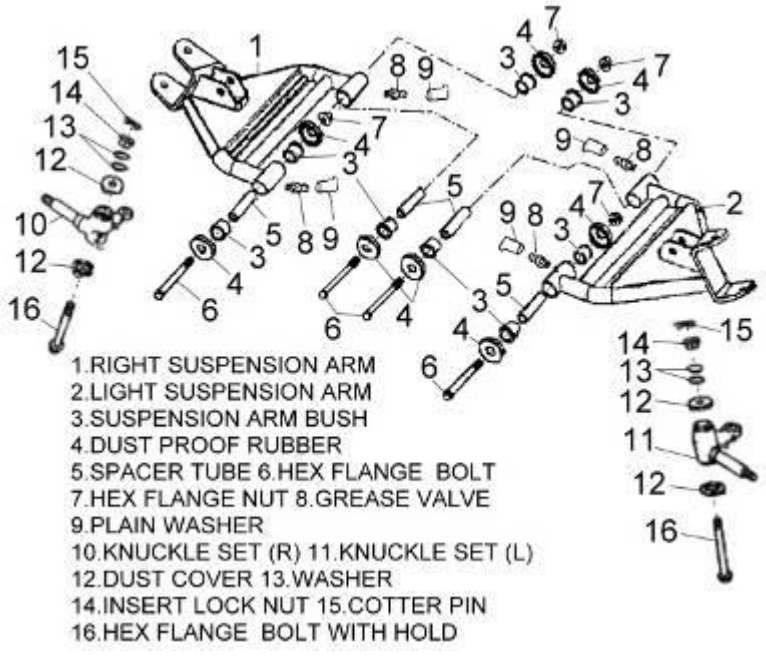


FIG-14. Rear Axle Ass'y

PROTECTIVE COVER

Loosen the bolts (a-1)

Remove the protective cover (a-2)

(Photo 52)

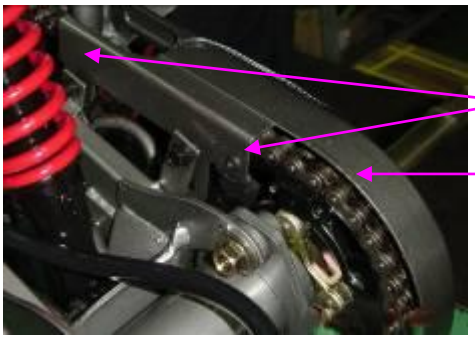


Photo 52

REAR AXLE

Loosen the nuts (a-1)

Remove the washer (a-2) and brake plate ass'y (a-3)

Remove the rear axle (a-4)

Remove the final drive sprocket ass'y (a-5)

(Photo 53)

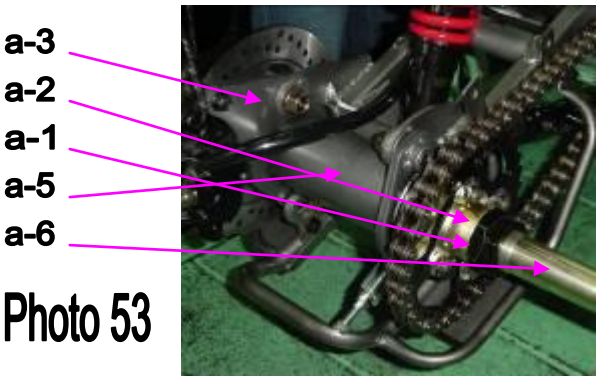


Photo 53

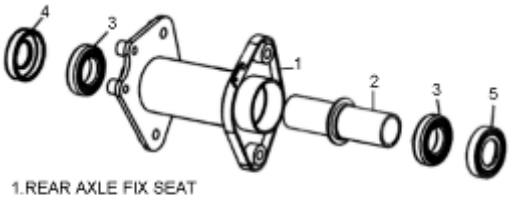
REAR AXLE FIX SEAT ASS'Y

Loosen the bolts (a-1)

Remove the rear axle fix seat ass'y (a-2)

Remove the adjuster chain (a-3) and nuts (a-4)

(Photo 54)



1.REAR AXLE FIX SEAT
2.SPACER TUBE
3.BEARING
4.OIL SEAL
5.OIL SEAL

SWING ARM SUB ASS'Y

Loosen the bolts (a-1) and nut (a-2)

Remove the swing arm sub ass'y (a-3)

Remove the swing arm spacer tube

Remove the rubber sleeve

(Photo 55)

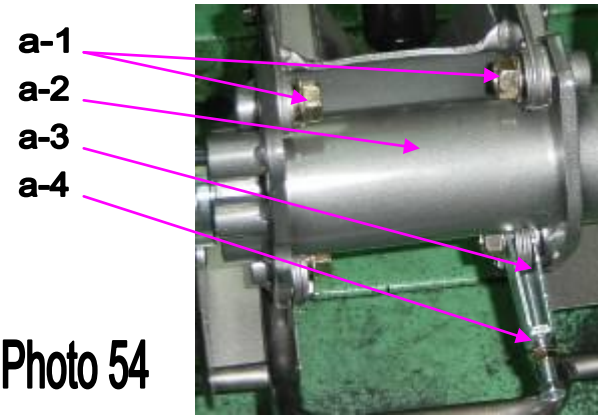


Photo 54

CAUTION

1. Before mounting swing arm, please smear grease on the swing arm spacer tube.

Note:

Refer to the preceding disassembly instructions for re-assembly.

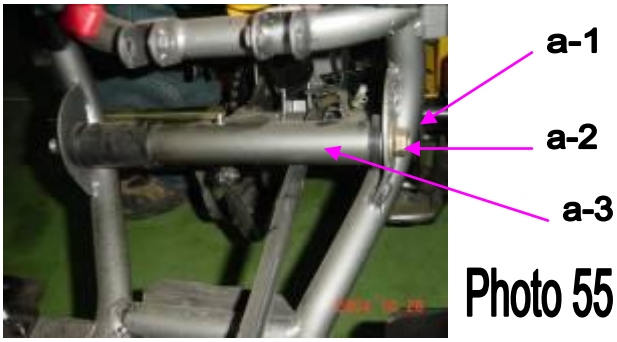


Photo 55

FIG-15. Steering Shaft

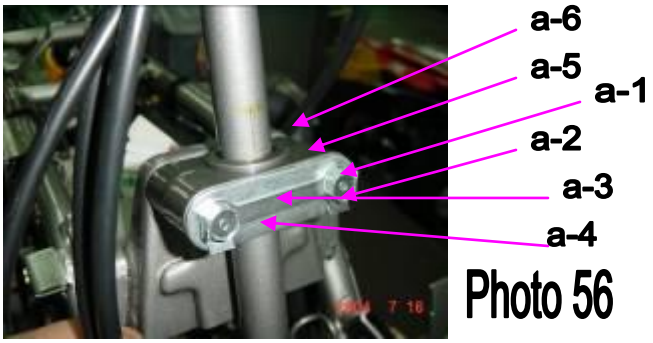


Photo 56

STEERING SHAFT

Turn on the spring washer (a-1)
Loosen the bolts (a-2)
Remove the spring washer (a-3) and cable fix seat (a-4)
Remove the steering shaft hold (a-5)
Remove the space ring steering shaft oil seal (a-6)
(Photo 56)

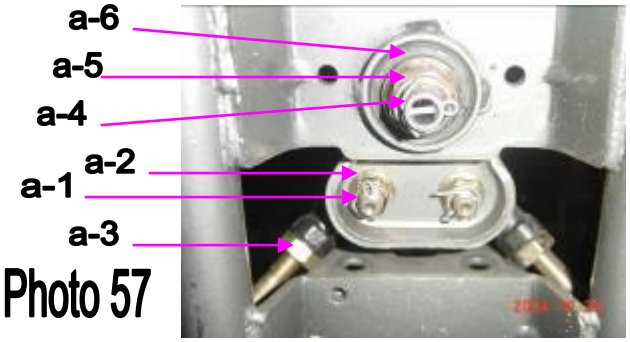


Photo 57

CAUTION

1. Before mounting steering shaft, please smear grease on the steering shaft oil seal.

Take off the cotter pin (a-1)
Loosen the nut (a-2)
Remove the steering tie-rod ass'y (a-3)
Take off the cotter pin (a-4)
Loosen the nut (a-5)
Remove the steering shaft ass'y (a-6)
(Photo 57)

CAUTION

1. Check that the steering can be turned smoothly after the steering shaft is mounted.
2. Check the oil seals and bearings on the bottom of the steering shaft.
3. Check those parts while the steering is dismounted or mounted.
4. Check the steering with the steering lock for normal movement.

1 STEERING SHAFT
2 STEERING TIE-ROD ASSY
3 STEERING SHAFT HOLD
4 STEERING SHAFT PU SLEEVE
5 SPACE RING
6 CABLE FIX SEAT
7 SPRING WASHER

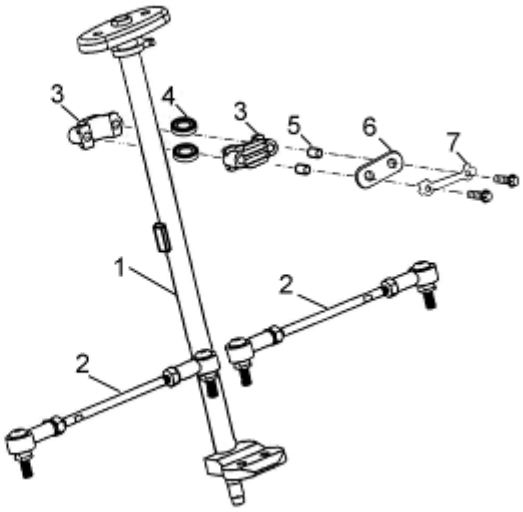


FIG-16. Frame Comp

FRAME COMP

Take off the o-ring (a-1)

Remove the steering bearing seat (a-2)

(Photo 58)

Note:

Refer to the preceding disassembly instructions for re-assembly.

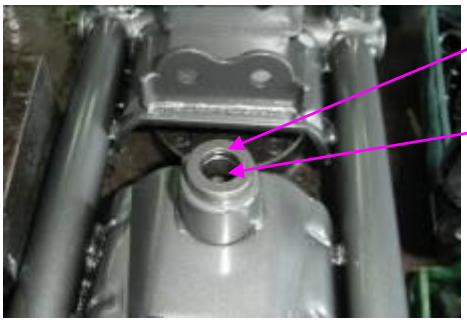


Photo 58

FIG-17. Light

HEAD LIGHT ASS'Y

Loosen the screws (a-1)

Remove the head light ass'y (a-2)

(Photo 59)

Photo 59

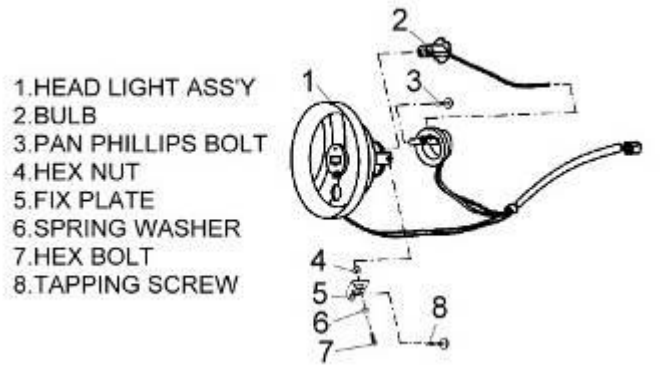
Turn off the light cover (a-1)

Remove the position light bulb ass'y (a-2)

(Photo 60)

CAUTION

1. The position light bulb specifications is 12V 10W
2. The head light bulb specifications is 12V 20W



TAIL LIGHT ASS'Y

Loosen the screws (a-1)

Remove the tail light cover (a-2)

(Photo 61)

CAUTION

1. When change the bulb only loosen the screws and then open the cover.
2. The tail light bulb specifications is P21/5W

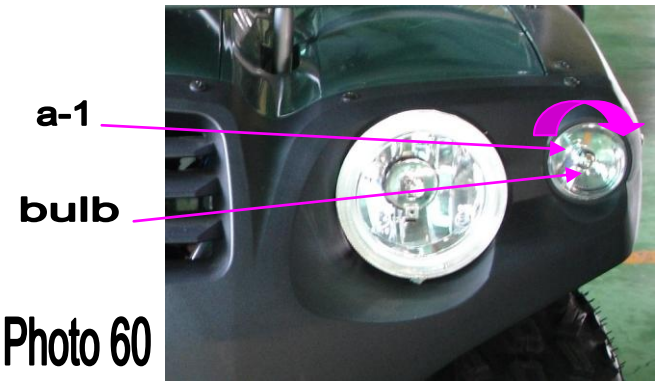


Photo 60

REFLECTOR

Loosen the nuts (a-3)

Remove the reflector (a-4)

(Photo 61)

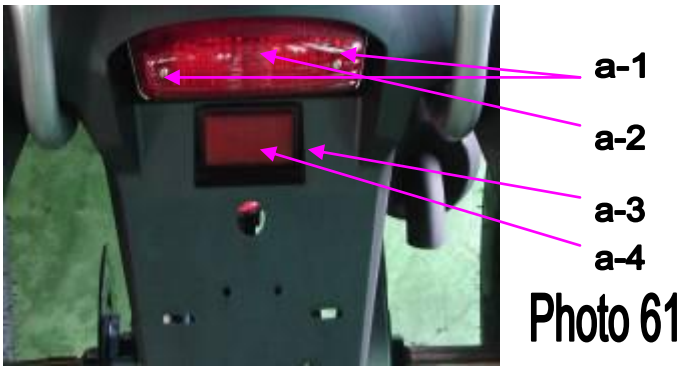


Photo 61

REVERSE INDICATOR

Turn off the light cover (a-1)

Remove the reverse indicator bulb ass'y (a-2)

(Photo 62)

CAUTION

1. The position light bulb specifications is 12V 10W

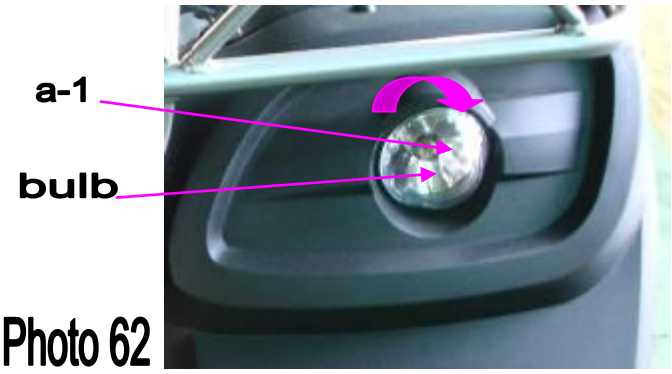


Photo 62

MEMO

FIG-18. Engine Disassembly

ENGINE SHOULD ONLY BE REMOVED IN THE CONDITIONS OF NECESSARY REPAIRS OR ADJUSTMENT TO THE TRANSMISSION AND COMBUSTION SYSTEM ONLY!

ENGINE REMOVAL
Remove the front, rear rack, and handle bar.
Remove the footrest.
Remove the spark plug cap from the spark plug.
Remove the exhaust muffler.
Disconnect the carburetor cable by unscrewing two screws on top of the carburetor.

Disconnect the wire connectors. There are three connectors for carburetor auto-choke, starter motor and generator respectively.

Remove the engine hanger bolts over the engine.
Remove the engine and air cleaner together.

ENGINE REPLACEMENT
Engine installation is essentially the reverse order of removal.

The torque of engine hanger bolt is 30 Nm

Route the wires and cable properly in reverse order of removal.

FIG-18. Engine Disassembly

LUBRICATION

SERVICE INFORMATION

GENERAL

This section describes inspection and replacement of the engine oil, oil filter screen and assembly of the oil pump.

Fill the oil pump with clean oil when reassembling the pump.

SPECIFICATIONS

Engine Oil Capacity	0.8-1.0 Liters
Engine Oil Recommendations	Viscosity: (*SAE 15W-40)*
	API Service classification: SF-SG

OIL PUMP

STANDARD	**SERVIC**	**LIMIT**
Cover-to-rotor clearance	---------	0.12
Rotor tip clearance	---------	0.12
End clearance	0.01-0.10	0.2

TORQUE VALUE

Oil Drain Bolt	20~30 n-m (2.0~3.0 kg-m)

TROUBLE SHOOTING

Oil level too low / high oil consumption

Normal oil consumption.

External oil leaks.

Oil not changed often enough.

Worn piston rings.

Faulty head gasket.

Oil contamination

Worn piston rings.

Faulty head gasket.

Oil or filter not changed often enough.

FIG-18. Engine Disassembly

LUBRICATION

ENGINE OIL LEVEL

Place the engine on the level plane.

Check the oil level with the oil level gauge, but do not screw it in when making this check.(a-1)

(Photo 1)

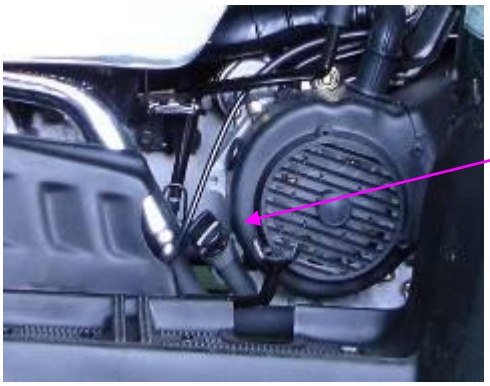


Photo 1

OIL LEVEL GAUGE

Add the recommended oil up to the upper level if the oil level is below or near lower level line on the gauge.

(Photo 2)

Photo 2

FIG-18. Engine Disassembly

LUBRICATION

ENGINE OIL & FILTER CHANGE

Remove the oil filter cap and the oil drain bolt. (a-1)
(Photo 3)

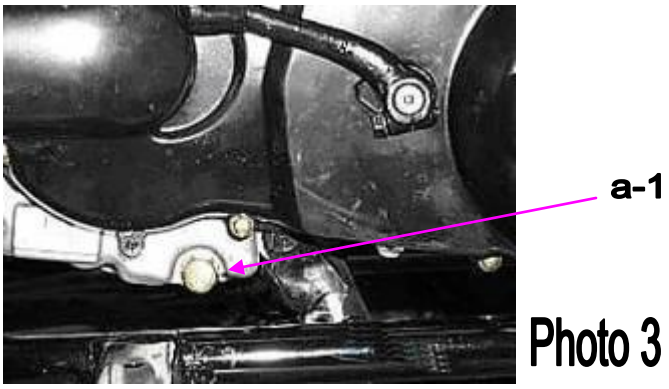


Photo 3

NOTE: drain the oil while the engine is warm to ensure complete draining.

Remove the oil filter cap (a-1), spring (a-2) and oil filter screen. (a-3)
Check the O-ring for damage or fatigue. (a-4)
Install a new oil filter screen and spring then install the cap.
(Photo 4)

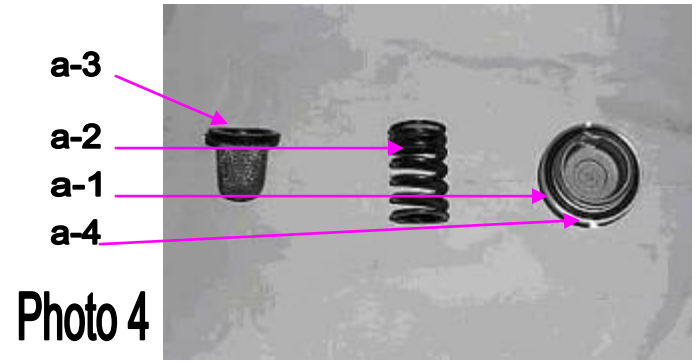


Photo 4

Install a new oil filter screen and spring then install the cap.
Install the oil drain bolt with sealing washer.

TORQUE: 20~30 n-m (2.0~3.0 kg-m)

Fill the crankcase with recommended oil.
Install the oil filter cap. (a-1)
(Photo 5)

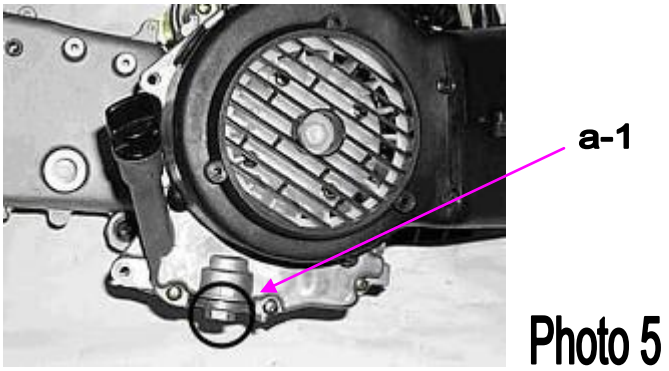


Photo 5

ENGINE OIL CAPACITY: 1.2 liter at draining.

Install the oil level gauge.
Start the engine and let it idling for 2 or 3 minutes.
Stop the engine and check that the oil level at the upper line on the gauge. Make sure there are no oil leaks.

FIG-18. Engine Disassembly

OIL PUMP REMOVAL

FAN COVER ASS'Y

Loosen the screw (a-1),

Remove the fan cover ass'y (a-2),

(Photo 6)

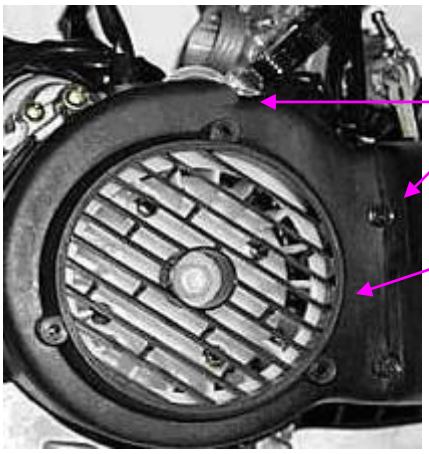


Photo 6

FAN

Loosen the screw (a-1),

Remove the cooling fan composition (a-2),

(Photo 7)

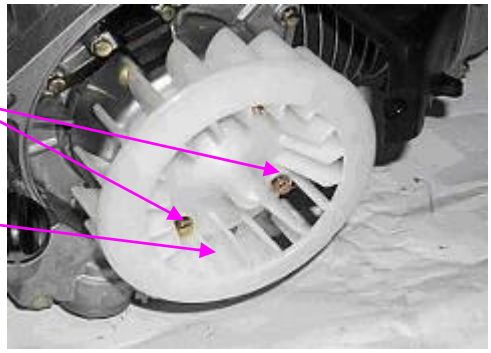


Photo 7

GENERATOR ASS'Y

Loosen the nut (a-1)

Use the special tool Remove the generator face flywheel. (a-2)

Loosen the bolts

Remove the stator comp.

(Photo 8)

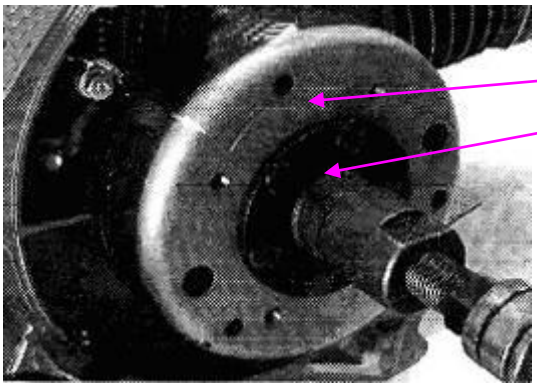


Photo 8

RIGHT CRANKCASE COVER

Loosen the bolts (a-1)

Remove the right crankcase cover. (a-2)

(Photo 9)

STARTING CLUTCH ASS'Y

Loosen the nut (a-1)

Remove the gear comp starting clutch (a-2)

Remove the starting clutch ass'y.

(Photo 10)

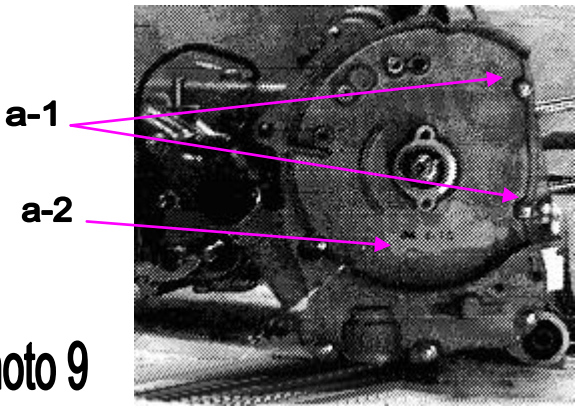


Photo 9

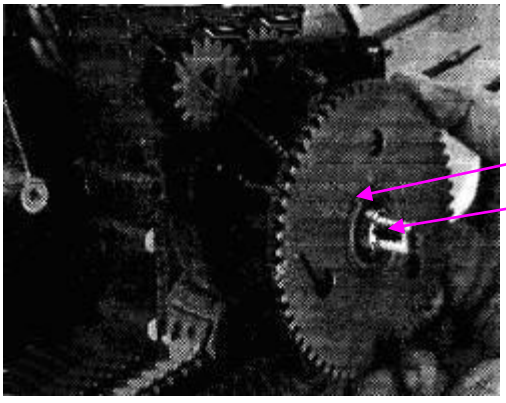


Photo 10

FIG-18. Engine Disassembly

OIL PUMP REMOVAL

OIL PUMP

Loosen the bolts (a-1)

Remove the oil separator. (a-2)

(Photo 11)

Remove the oil pump chain (a-1)

Remove the oil pump drive (a-2)

(Photo 12)

Loosen the bolts (a-1)

Remove the oil pump ass'y (a-2)

(Photo 13)

Note:

Refer the foregoing disassembly procedures to re-assemble.

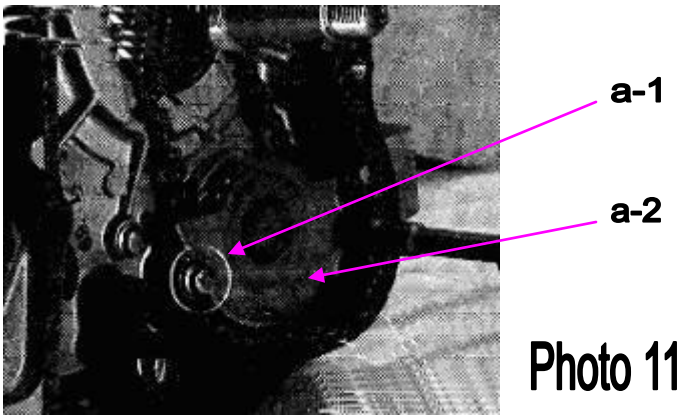


Photo 11

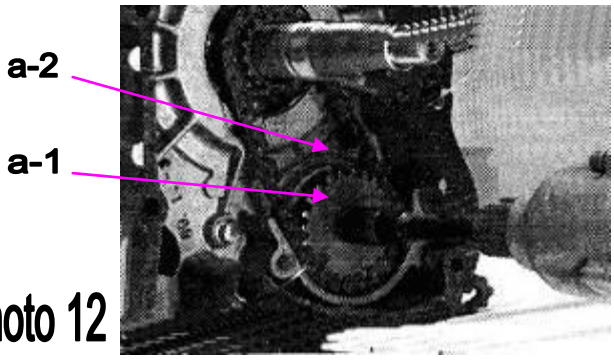


Photo 12

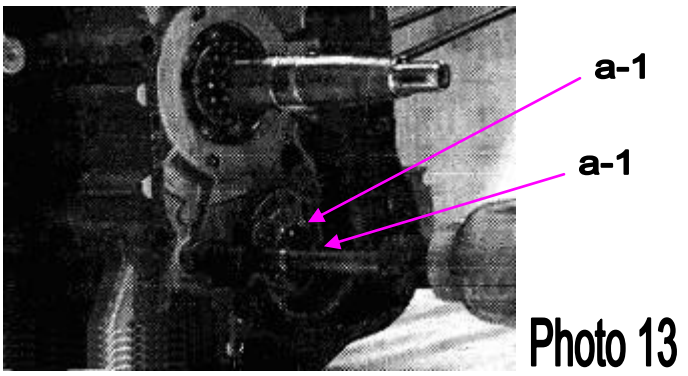


Photo 13

FIG-18. Engine Disassembly

OIL PUMP REMOVAL

DISASSEMBLE THE OIL PUMP

INSPECTION

Measure the oil pump rotor-to-body clearance.
(Photo 14,15)
SERVICE LIMIT: 0.12 mm

Install the oil pump shaft and measure the pump clearance.
(Photo 16)
SERVICE LIMMIT: 0.12 mm.

Remove the oil pump shaft and measure the pump and clearance.
(Photo 17)
SERVICE LIMMIT: 0.2 mm.

Install the outer rotor, inner rotor and oil pump shaft onto the body.
(Photo 18)

NOTE: Pour a drop of clean engine oil inside the oil pump

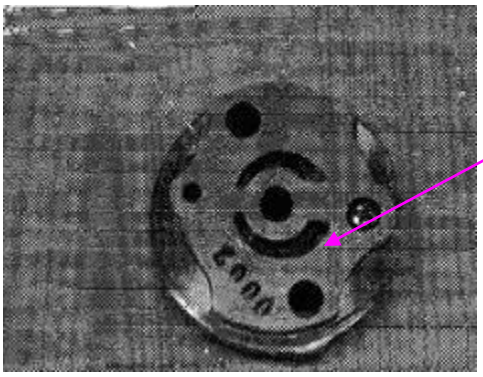


Photo 14

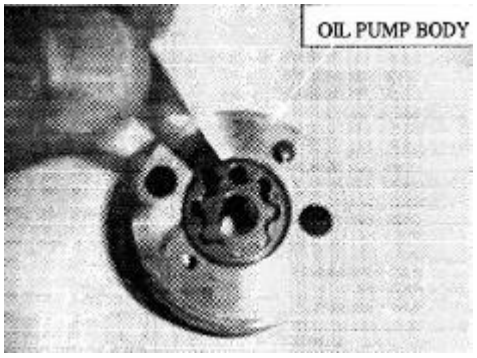


Photo 15

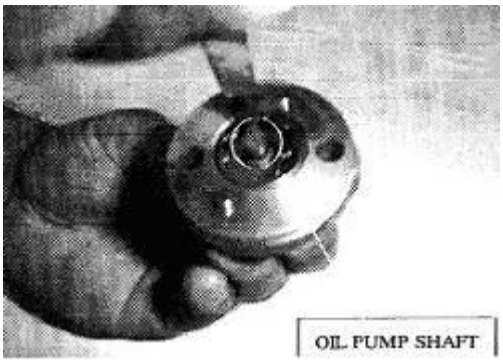


Photo 16

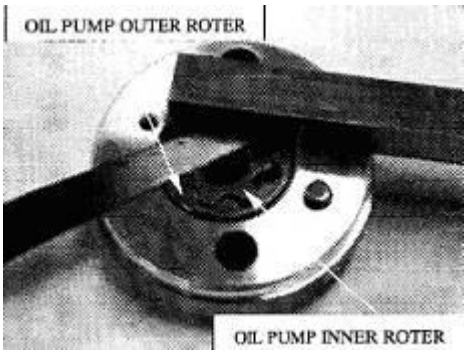


Photo 17

Photo 18

FIG-18. Engine Disassembly

CYLINDER HEAD / VALVES

SERVICE INFORMATION

GENERAL

This section describes the maintenance of cylinder head, valves, camshaft and associated parts

The engine must be removed from the frame to service cylinder head.

Camshaft lubrication oil is fed to the cylinder head through an oil orifice in the engine case

Before installing the cylinder head be sure the orifice is not clogged and the gasket, O-ring and dowel pins are in place.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Cylinder compression		**12±0.5 kg/cm^2**	**---------**
Cam lobe height	**IN** **EX**	**25.965/27.195** **25.810/27.20**	**25.57/26.7** **25.40/26.80**
Rocker arm I.D.		**10.000-10.018**	**10.10**
Rocker arm shaft O.D.		**9.972-9.987**	**9.91**
Valve spring free length	**IN** **EX**	**32.3** **35.0**	**31.2** **34.1**
Valve stem O.D.	**IN** **EX**	**4.975-4.990** **4.955-4.970**	**4.90** **4.90**
Valve guide I.D.	**IN/EX**	**5.000-5.012**	**5.30**
Stem-to-guide clearance	**IN** **EX**	**0.010-0.037** **0.030-0.057**	**0. 08** **0.10**
Valve seat width	**IN** **EX**	**1. 0** **1.0**	**1. 8** **1.8**

TORQUE VALUES

Cylinder head bolts	8~12 n-m (0.8~12 kg-m)
Camshaft holder flange nuts	20~24 n-m (2.0~2.4 kg-m)
Tappet adjusting nut	9~12 n-m (0.9~1.2 kg-m)

FIG-18. Engine Disassembly

CYLINDER HEAD / VALVES

TROUBLE SHOOTING

Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test, or by tracing engine noise to the top end with a sounding rod or stethoscope.

Low compression valve

Incorrect valve adjustment.
Worn or damaged valve seats.
Burned or bent valve.
Incorrect valve timing.
Weak valve spring.

Cylinder head

Leaking or damaged head gasket.
Warped or cracked cylinder head.
Faulty cylinder or piston

Excessive noise

Incorrect valve adjustment
Sticking valve or broken valve spring.
Worn or damaged rocker arm or camshaft.
Worn or damaged cam chain.
Worn or damaged cam chain tensioned.
Worn cam sprocket teeth.

Excessive smoke

Damaged valve stem seal.
Faulty cylinder or piston rings.

FIG-18. Engine Disassembly

CYLINDER HEAD / VALVES

CYLINDER HEAD ASS'Y REMOVAL

SHROUD ASS'Y

Loosen the bolts (a-1)

Remove the carburetor overflow tube

Remove the intake manifold

Loosen the bolts

Remove the shroud

(Photo 19)

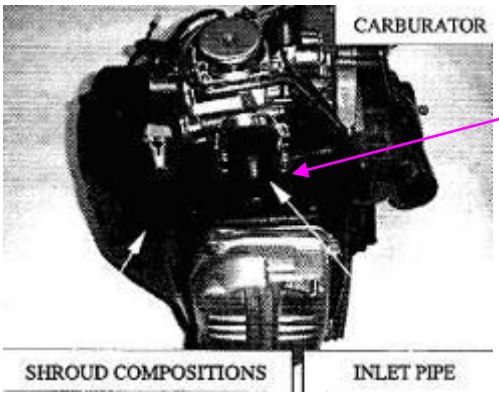


Photo 19

LIFTER TENSIONER LIFTER

Relax the cam chain adjuster screw. (a-1)

Remove the screw and O-ring and tighten the cam chain adjusting bolt with clockwise direction. (a-2)

(Photo 20)

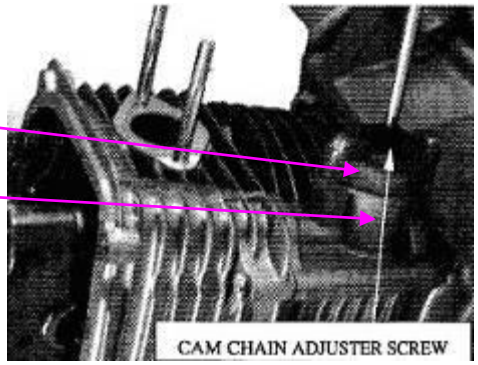


Photo 20

CYLINDER HEAD COVER ASS'Y

Loosen the bolts (a-1)

Remove the cylinder head cover ass'y (a-2)

(Photo 21)

Photo 21

COTTER VALVE

Remove the nuts and washers (a-1)

Remove the cotter valve (a-2)

Remove the camshaft holder and dowel pins.

(Photo 22)

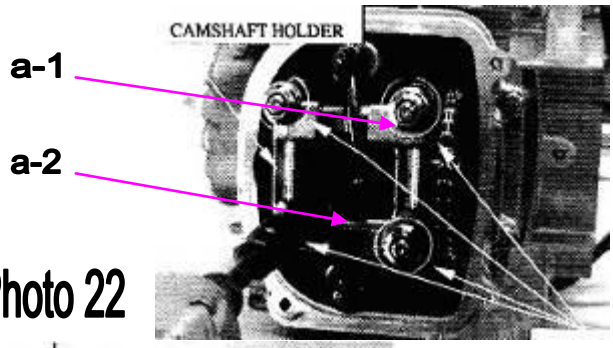


Photo 22

Relax the camshaft gear from cam chain and remove the camshaft.

(Photo 23)

Photo 23

FIG-18. Engine Disassembly

CAMSHAFT COMP

INSPECTION

Inspect the cam lobes surface and height of cam lobes for wear or damage. (a-1)
(Photo 24)

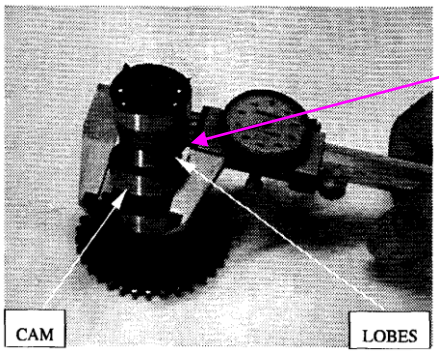


Photo 24

SERVICE LIMIT: IN：25.57/26.18 mm

EX：25.41/26.02 mm

Inspect the camshaft and bearings for wear or damage and replace them if necessary.
(Photo 25)

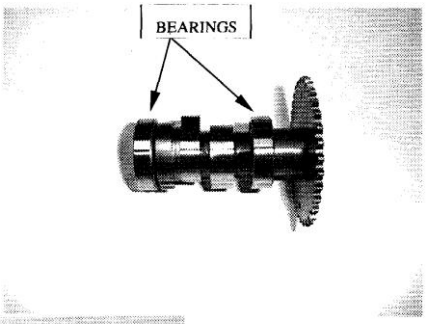


Photo 25

Screw a 5 mm bolt into the rocker arm shaft threaded end and pull on the bolt to remove the shafts and rocker arms.
(Photo 26)

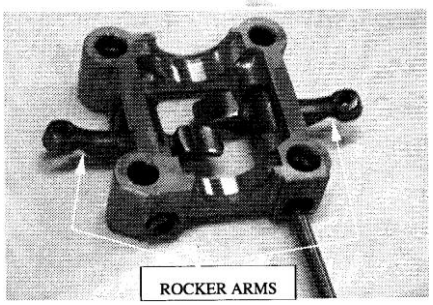


Photo 26

Inspect the camshaft holder, rocker arms and rocker arm shafts for wear or damage.
(Photo 27)

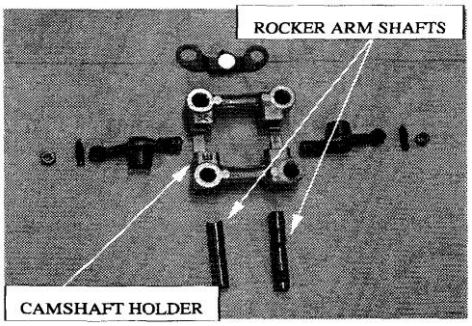


Photo 27

Measure the I.D. of each rocker arm. (a-1)
SERVICE LIMIT: 10.10 mm
Measure the O.D. of each rocker arm shaft. (a-2)
SERVICE LIMIT: 9.91 mm
(Photo 28)

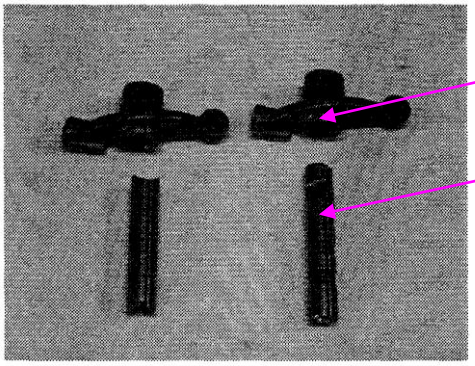


Photo 28

FIG-18. Engine Disassembly

CYLINDER HEAD REMOVAL

Remove the flange bolts and cylinder head
(Photo 29)

Remove the cylinder head gasket and dowel pins
(Photo 30)

Remove the cam chain guide
(Photo 31)

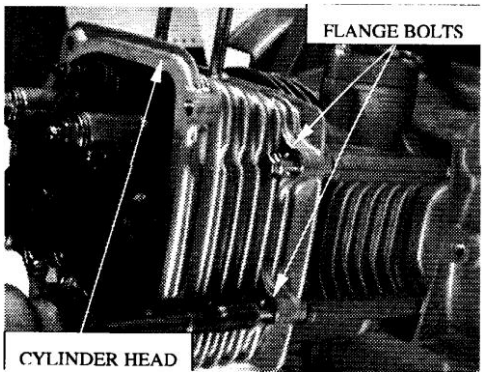


Photo 29

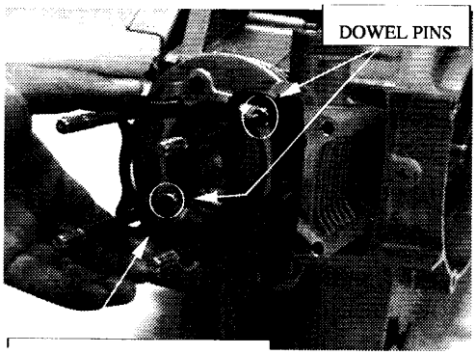


Photo 30

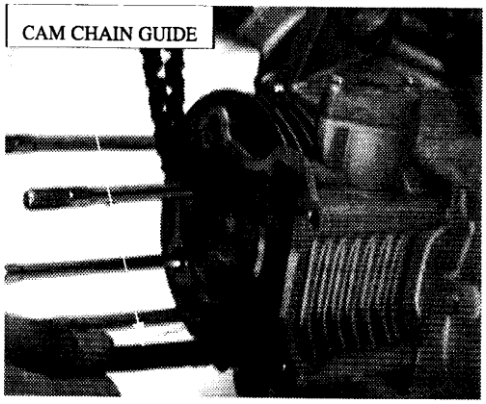


Photo 31

FIG-18. Engine Disassembly

CYLINDER HEAD DISASSEMBLY

Remove the valve cotters, spring retainers and valve springs with a valve spring compressor.
(Photo 32)

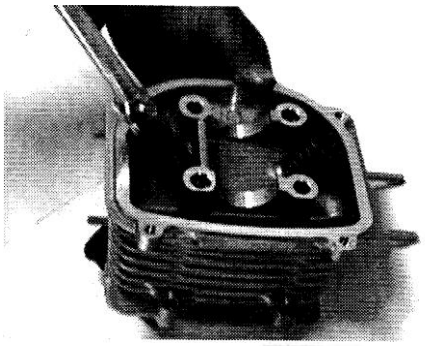


Photo 32

INSPECTION

Clean off all carbon deposits from the combustion dome and check the spark plug hole and valve area for cracks
(Photo 33)

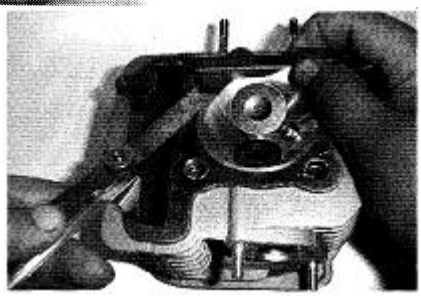


Photo 33

Measure the cylinder head diagonally for warp with a straight edge and feeler gauge.
(Photo 34)

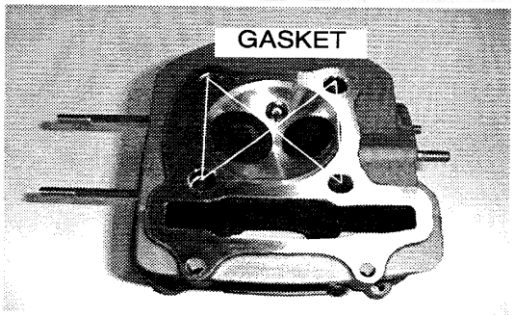


Photo 34

Measure the free length of the inner and outer valve springs.
(Photo 35)
SERVICE LIMITS: Inner 31.2 mm
Outer 34.1 mm

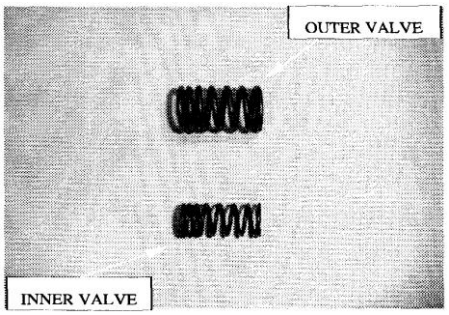
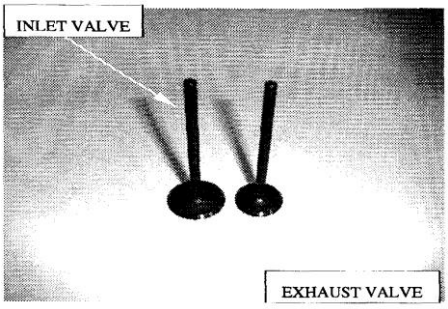


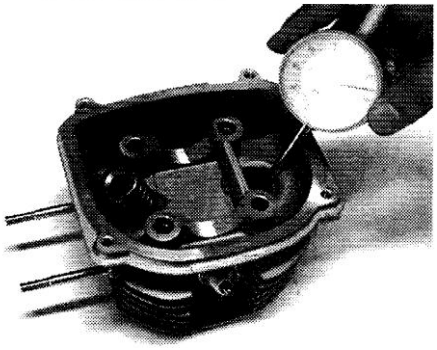
Photo 35

Inspect each valve stem for turning, burning, scratches or abnormal wear.
Check the valve for movement in the guide.
(Photo 36)



Measure and record each valve stem O.D.
SERVICE LIMITS: 4.90 mm
Measure and record the valve guide I.D.
SERVICE LIMITS: IN / EX 5.30 mm
Calculate the stem-to-guide clearance.
SERVICE LIMITS: IN 0.08 mm
EX 0.10 mm

Photo 36



NOTE: If the stem-to-guide clearance exceeds the service limits, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace guides as necessary and ream to fit. If the valve guide is replaced, the valve seat must be ground.

FIG-18. Engine Disassembly

CYLINDER HEAD ASS'Y

Lubricate each valve stem with oil.
Insert the valves into the guides.
Install the valve springs, retainers and the cotters.
(Photo 37)

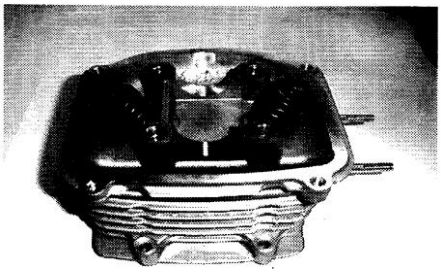


Photo 37

NOTE: To prevent loss of tension, don't compress the valve springs more than necessary.

INSTALLATION
Install the new gasket and dowel pins.
(Photo 38)

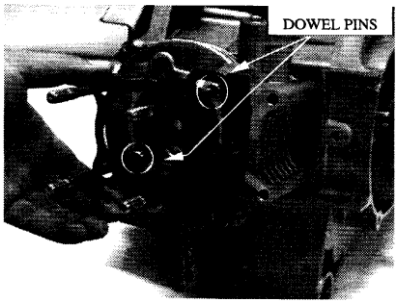


Photo 38

Install the cam chain guide.
(Photo 39)

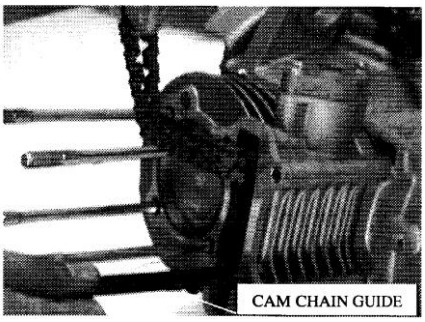


Photo 39

Install the cylinder head.
(Photo 40)

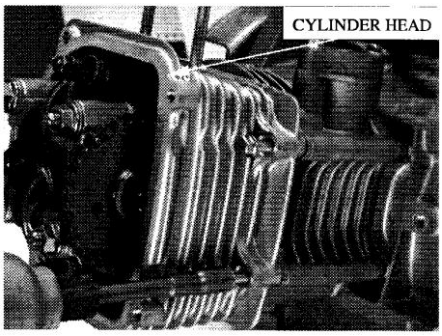


Photo 40

CAMSHAFT ASS'Y INSTALLATION
Install the rocker arms and rocker arm shafts into the camshaft holder.
(Photo 41)

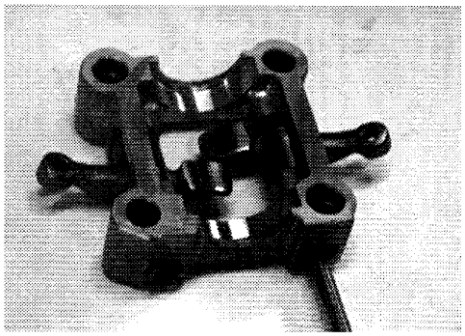


Photo 41

Align the "T" mark on the flywheel with the index mark on the alternator cover by turning the flywheel counter-clockwise.
(Photo 42)

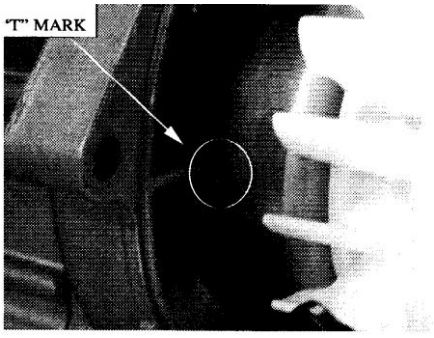


Photo 42

FIG-18. Engine Disassembly

CYLINDER HEAD ASS'Y

CAMSHAFT ASS'Y INSTALLATION

Position the camshaft gear with cam chain so that its "I" mark aligns with the cylinder head surface and the circle hole towards the front.
(Photo 43)

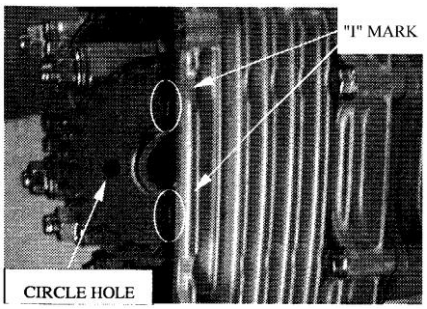


Photo 43

Install the dowel pins and camshaft holder.
Tighten the washers and nuts
(Photo 44)
Torque: 20 n-m (2.0 kg-m)

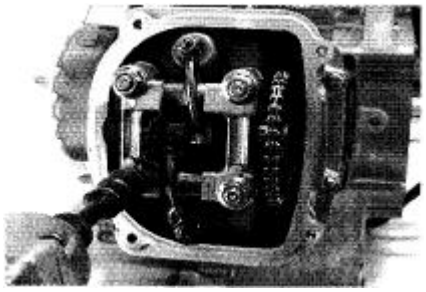


Photo 44

Adjust the clearance between the rocker arm and valve stem by applying a feeler gauge.
(Photo 45)
STANDARD VALVE: 0.08 mm

Photo 45

Relax the cam chain-adjusting bolt with clockwise direction and install the o-ring and screw.
(Photo 46)

Install the cylinder head cover.

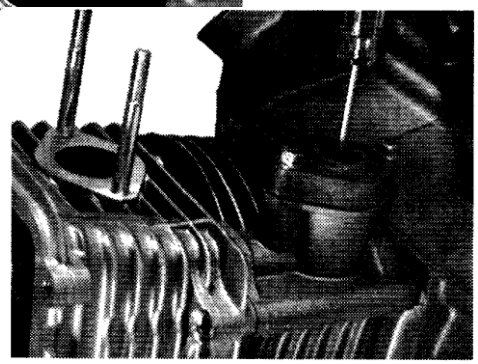


Photo 47

FIG-18. Engine Disassembly

CYLINDER AND PISTON

SERVICE INFORMATION

GENERAL

Camshaft lubrication oil is fed to the cylinder head through an oil orifice in the cylinder head and engine case. Before installing the cylinder head be sure the orifice is not clogged and the gasket, O-ring and dowel pins are in place.

SPECIFICATION

ITEM			STANDARD	SERVICE LIMIT
Cylinder	**I.D.**		**52,400-52,410/ 61,730-61,740**	**52.50/ 61.830**
	Taper		**----------**	**0.10**
	Out of round		**----------**	**0.10**
	Warp across top		**----------**	**0.10**
Piston	**Piston O.D.**		**52,370-52,390 61,700-61,720**	**52,3/ 61,63**
Piston pin	**Piston pin bore**		**15.002-15.008**	**15.04**
Piston rings	**Piston pin O.D.**		**14.994-15.000**	**14.960**
	Piston-to-pin clearance		**0.002-0.014**	**0.02**
	Piston ring	**TOP**	**0.015-0.050**	**0.12**
		SECOND	**0.015-0.050**	**0.12**
	Groove Clearance	**TOP/SEC**	**0.10-0.25**	**0.5**
	Piston ring end gap	**OIL**	**0.2-0.7**	**----------**
Cylinder-to-piston clearance			**0.0005-0.1025**	**0.1**
Connecting rod small end I.D.			**15.010-15.028**	**15.06**

TORQUE VALUES

Cylinder head bolts	8~12 n-m (0.8~1.2 kg-m)
Camshaft holder flange nuts	20~24 n-m (2.0~2.4 kg-m)
Tappet adjusting nut	9~12 n-m (0.9~1.2 kg-m)

FIG-18. Engine Disassembly

CYLINDER AND PISTON

TROUBLESHOOTING

Low or unstable compression

Worn cylinder or piston rings.

Overheating

Excessive carbon build-up on piston or combustion chamber wall

Knocking or abnormal noise

Worn piston and cylinder.

Excessive carbon build-up.

Excessive smoke

Worn cylinder, piston, or piston rings.

Improper installation of piston rings

Scored or scratched piston or cylinder wall

Damaged valve stem seal.

FIG-18. Engine Disassembly

CYLINDER AND PISTON

CYLINDER REMOVAL

Remove the cylinder head.
(Photo 47)

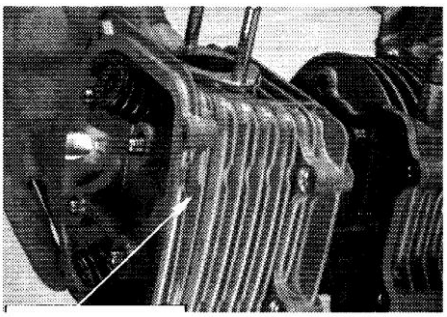


Photo 47

Remove the cylinder.
(Photo 48)

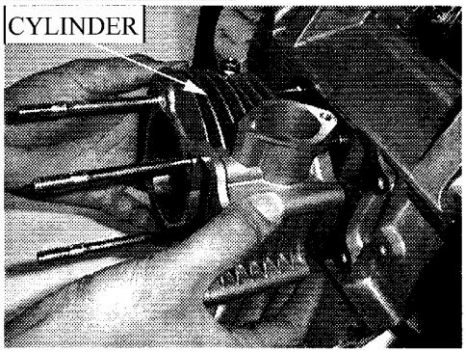


Photo 48

Remove the cylinder gasket and dowel pins
(Photo 49)

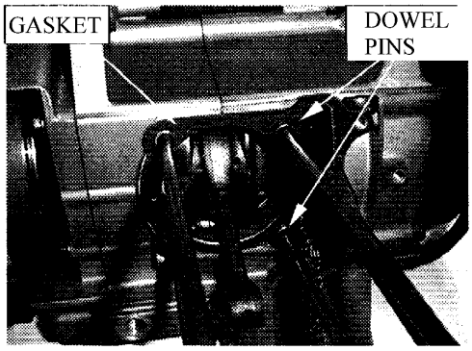


Photo 49

Clean off any gasket materials from the cylinder surface.
(Photo 50)

NOTE: Be carefully not to damage the gasket surface.

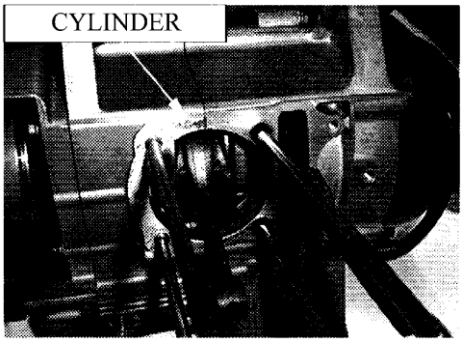


Photo 50

FIG-18. Engine Disassembly

CYLINDER AND PISTON

PISTON REMOVAL

Stuff a shop towel into the crankcase.

Remove the piston pin clip with needle nose pliers.
(Photo 51)

NOTE: Do not allow the clip to fall into the crankcase.

Remove the piston pin from the piston

Remove the piston.
(Photo 52)

Spread each piston ring and remove it by lifting up at a point opposite the gap
(Photo 53,54)

INSPECTION

Inspect the cylinder walls for scratches or wear
(Photo 55,56)

Measure and record the cylinder I.D. at three levels in both an X and Y-axis. Take the maximum reading to the cylinder wear.

SERVICE LIMITS: 0.10 mm

Calculate cylinder taper at three levels in an X and Y-axis

Take the maximum reading to determine the out-of-round

SERVICE LIMITS: 0.10 mm

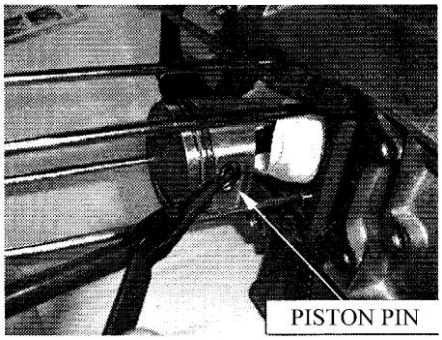


Photo 51

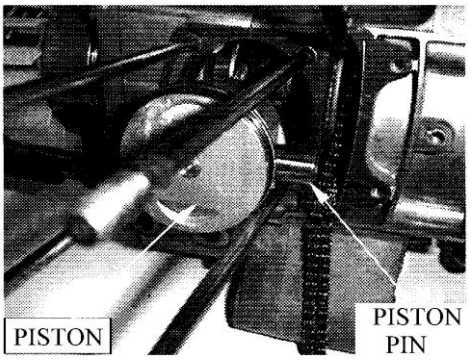


Photo 52

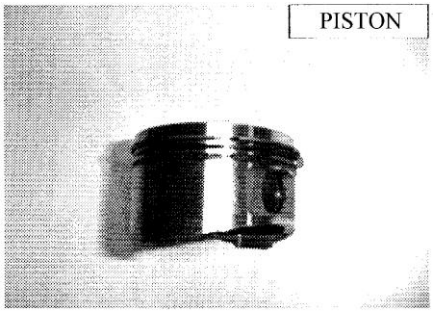


Photo 53

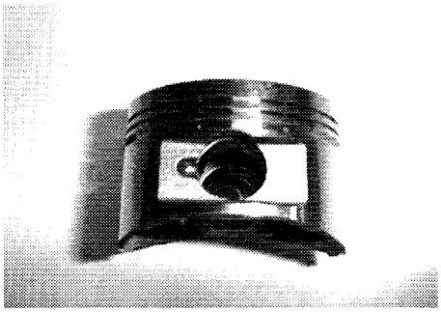


Photo 54

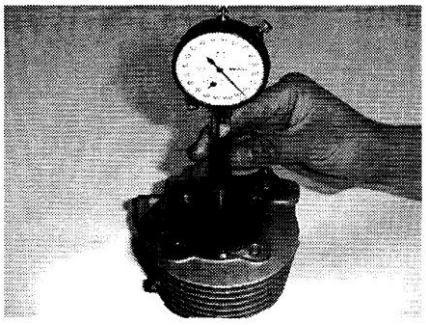


Photo 55

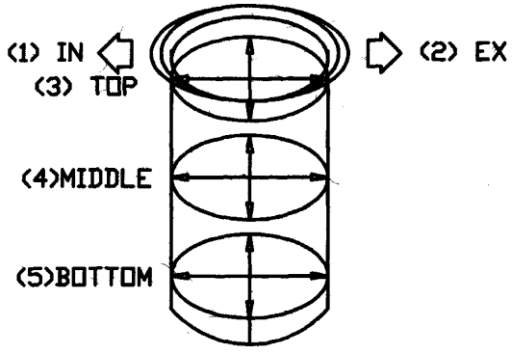


Photo 56

FIG-18. Engine Disassembly

CYLINDER AND PISTON

INSPECTION

Inspect the top of the cylinder for warp
(Photo 57)
SERVICE LIMITS: 0.10 mm

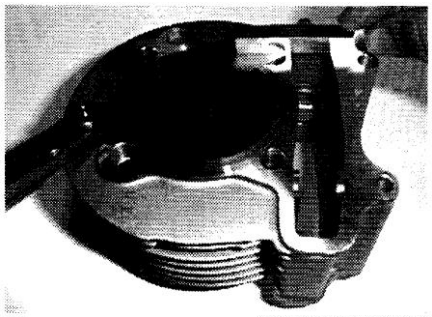


Photo 57

PISTON / PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.
(Photo 58)
SERVICE LIMITS: TOP 0.12 mm
SECOND 0.12 mm

Photo 58

Inspect the piston for wear or damage.
Insert each piston ring into the cylinder and measure the ring end gap.
(Photo 59,60)

PISTON

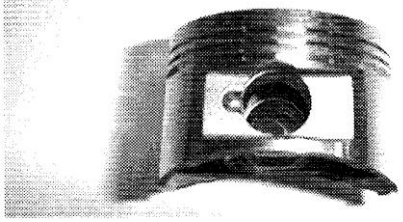


Photo 59

NOTE: Push the rings into the cylinder with the top of the piston to be sure they are squarely set in the cylinder,

SERVICE LIMITS: TOP 0.5 mm
SECOND 0.5 mm

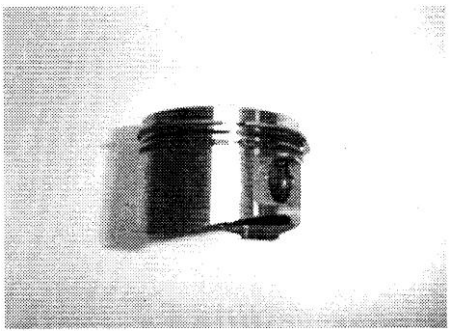


Photo 60

Measure the piston pin O.D.
(Photo 61)
SERVICE LIMIT: 14.960 mm

PISTON PIN

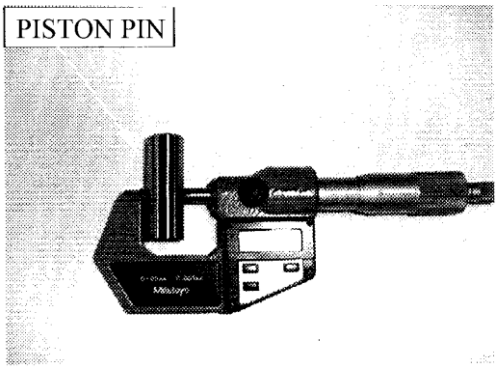


Photo 61

Measure the piston pin O.D.
(Photo 62)
SERVICE LIMIT: 15.04 mm

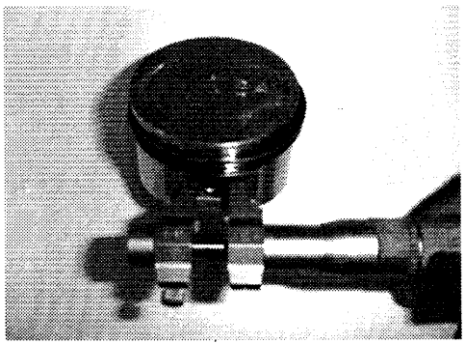


Photo 62

FIG-18. Engine Disassembly

CYLINDER AND PISTON

PISTON / PISTON RING INSPECTION

Calculate the piston-to-piston pin clearance.
(Photo 63)
SERVICE LIMITS: 0.02 mm

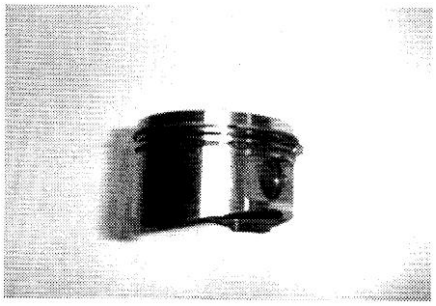


Photo 63

Measure the connecting rod small end I.D.
(Photo 64)
SERVICE LIMITS: 15.06 mm

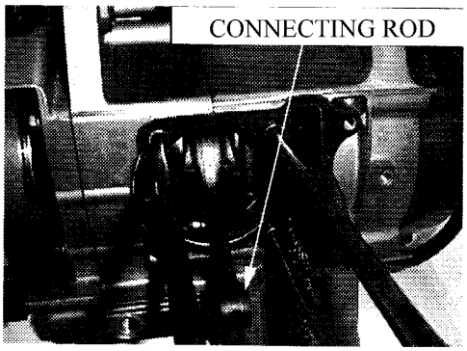


Photo 64

PISTON &PISTON RING INSTALLATION

Clean the piston ring grooves thoroughly and install the piston ring with the marks facing up.

NOTE: Don't interchange the top and second rings to avoid piston and piston ring damage during installation.

Space the piston ring end gaps 120 degrees apart
(Photo 65)

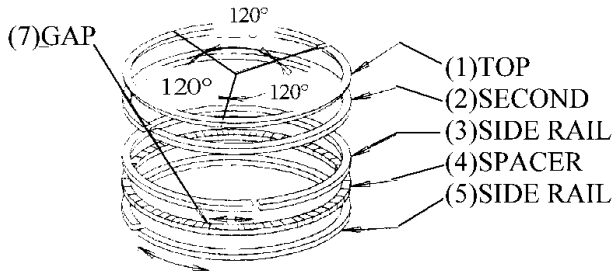
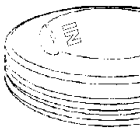


Photo 65

PISTON INSTALLATION

Install the piston with it's "IN" mark on the intake valve
(Photo 66)



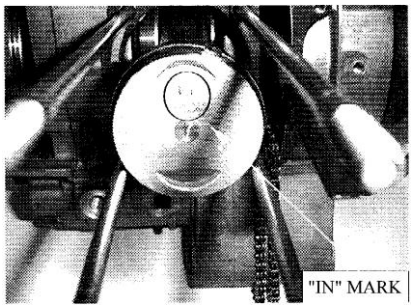


Photo 66

Install the piston pin with new pin clips.
Do not align the piston pin clip end gap with the piston cutout.
(Photo 67)

NOTE: do not allow the clip to fall into the crankcase.

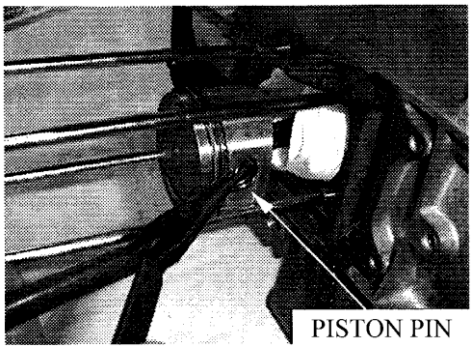


Photo 67

FIG-18. Engine Disassembly

CYLINDER AND PISTON

CYLINDER INSTALLATION

Clean any gasket material from the crankcase surface.
(Photo 68)

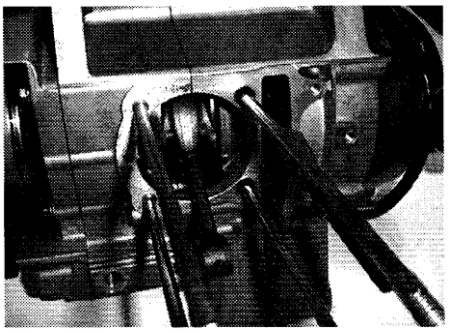


Photo 68

NOTE: Be carefully not to damage the gasket surface. Install the dowel pins a new gasket.

Coat the cylinder bore and piston rings with engine oil and install the cylinder.
(Photo 69,70)

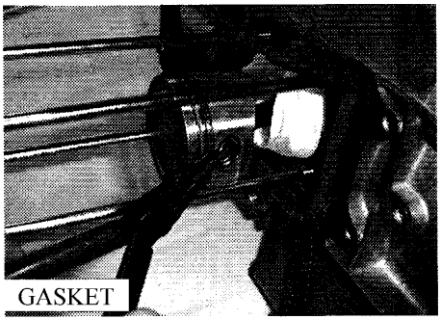


Photo 69

NOTE: Avoid piston rings damage cylinder bore during installation. Do not allow the cam chain fall into the crankcase.

Install the cylinder head.
(Photo 71)

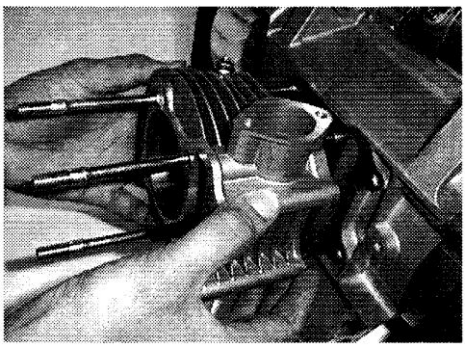


Photo 70

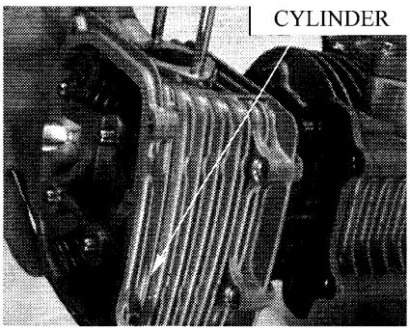


Photo 71

FIG-18. Engine Disassembly

TRANSMISSION & KICK STARTER

SERVICE INFORMATION

If the drain tube ass'y fills with water, the tube should be drained.

SPECIFICATIONS

ITEM	STANDARD (mm)	SERVICE LIMIT (mm)
Driven the width	19.8-20.2	19.0
Weight roller O.D.	15.0-15.02/17.0-17.02	14.6/16.6
Movable drive face I.D.	27.98-28.0	28.03
Drive face collar I.D.	24.06-24.09	24.098
Drive face boss O.D.	23.96-23.98	23.92
Clutch outer I.D.	124.8-125.2	125.5
Clutch weight lining thickness	----------	1.5
Driven face spring length	168.4-169.4	164.0

TORQUE VALUES

Clutch outer nut	55 N-m (5.5 kg-m)
Drive face nut	55 N-m (5.5 kg-m)

TROUBLE SHOOTING

Engine starts but can't travel

Worn driven belt

Worn clutch lining.

Damaged driven face spring.

Low engine power

Worn driven belt.

Worn weight roller.

Dirty driven face.

FIG-18. Engine Disassembly

TRANSMISSION & KICK STARTER

DISASSEMBLE LH CRANKCASE COVER

Relax the band screw (a-1) and remove the C.V.T inlet duct.

(Photo 72)

Photo 72

Loosen the screws (a-1)

Remove the air cleaner case. (a-2)

(Photo 73)

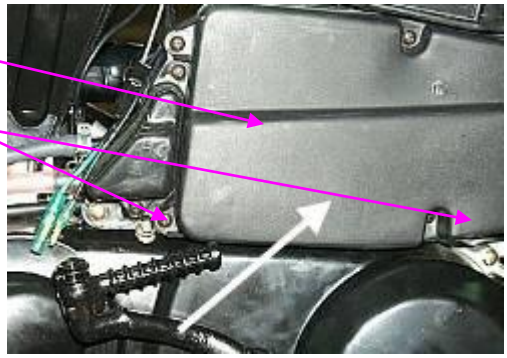


Photo 73

Loosen the bolts (a-1)

Remove the bolts and LH crankcase cover. (a-2)

(Photo 74)

Remove the gasket and dowel pins

(Photo 75)

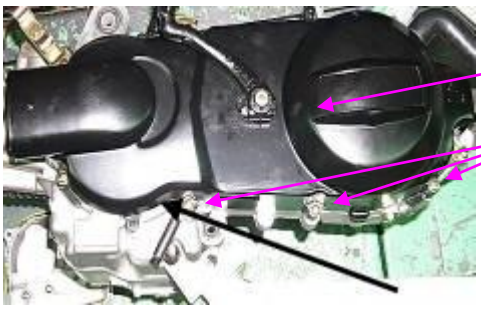


Photo 74

Clean off any gasket material from L crankcase surface.

(Photo 76)

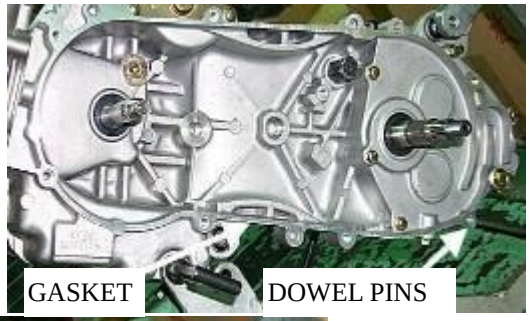


Photo 75

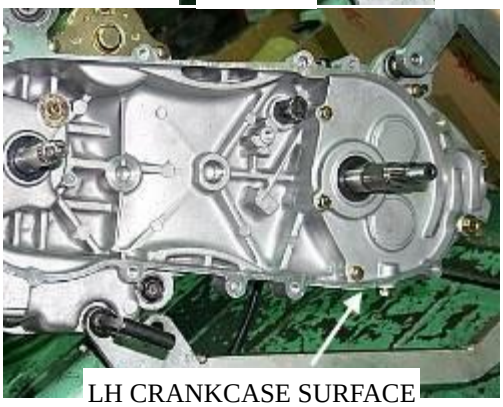


Photo 76

FIG-18. Engine Disassembly

TRANSMISSION & KICK STARTER

C.V.T REMOVAL

Relax the flange nut (a-1), and remove the drive face. (a-2)
(Photo 77)

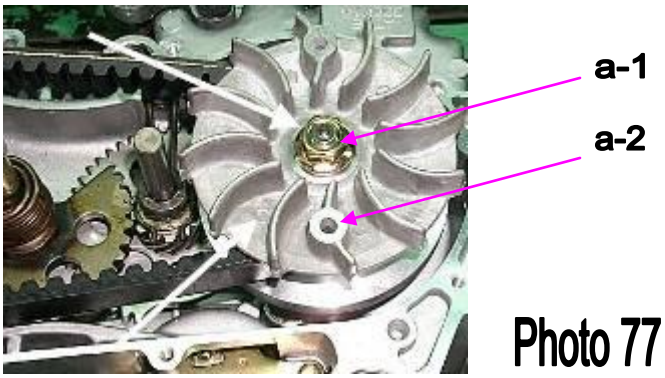


Photo 77

Relax the flange nut. (a-1)
Remove the drive pulley ass'y and driven belt. (a-2)
(Photo 78)

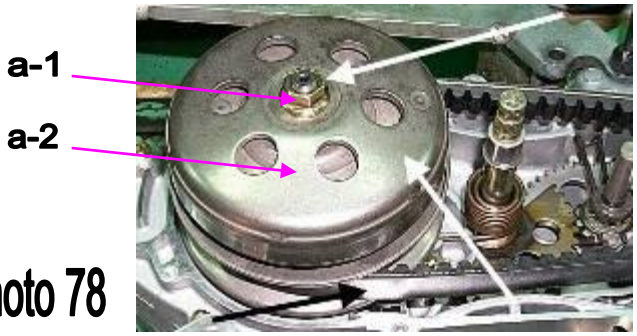


Photo 78

Remove the drive face boss (a-1) and movable driven face ass'y. (a-2)
(Photo 79)

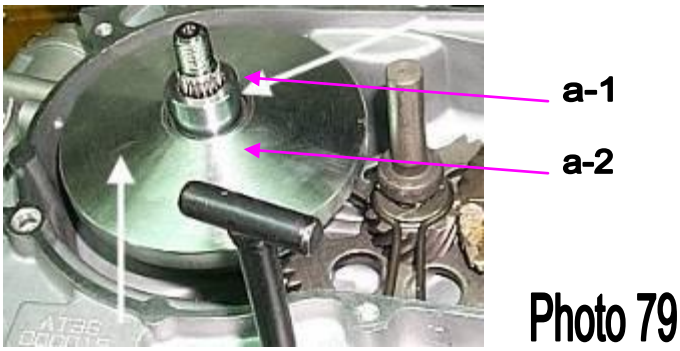


Photo 79

Remove the ramp plate and weight roller set
(Photo 80)

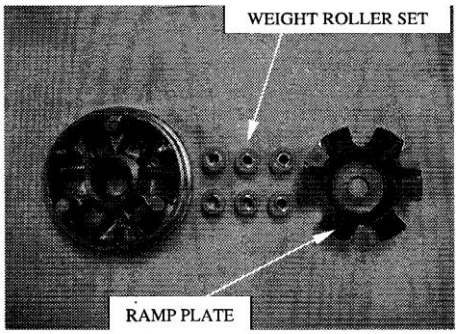


Photo 80

Relax the special nut and remove the driven plate composition and driven face spring
(Photo 81)

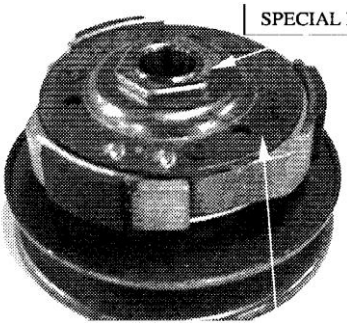


Photo 81

FIG-18. Engine Disassembly

TRANSMISSION & KICK STARTER

INSPECTION

Inspect the drive belt for wear, tears or damage.
Measure the width of drive belt.
(Photo 82)
SERVICE LIMIT: 19.0 mm

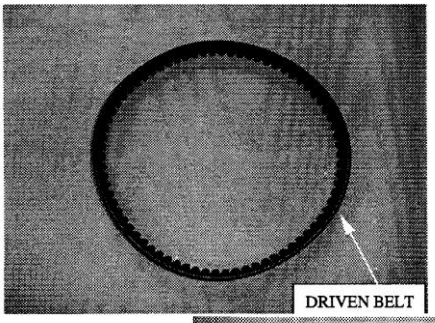


Photo 82

Inspect the weight roller for wear or damage and replace them if necessary
Measure the O.D. of weight rollers.
(Photo 83)
SERVICE LIMIT: 14.6/16.6 mm

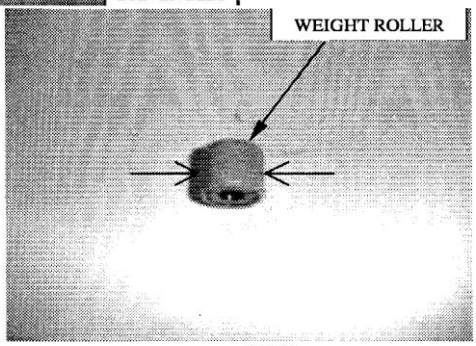


Photo 83

Inspect the drive face collar for wear or damage.
Measure the I.D. of drive face collar.
(Photo 84)
SERVICE LIMIT: 24.098 mm

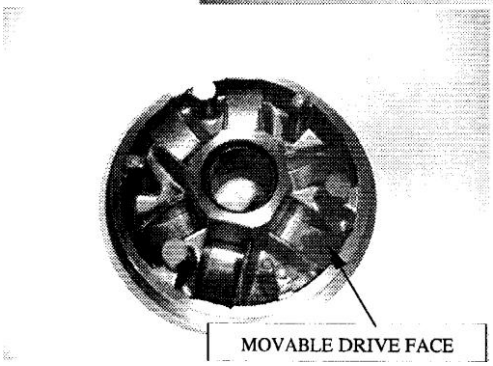


Photo 84

Inspect the drive face boss for wear or damage.
Measure the O.D. of drive face boss.
(Photo 85)
SERVICE LIMIT: 23.92 mm

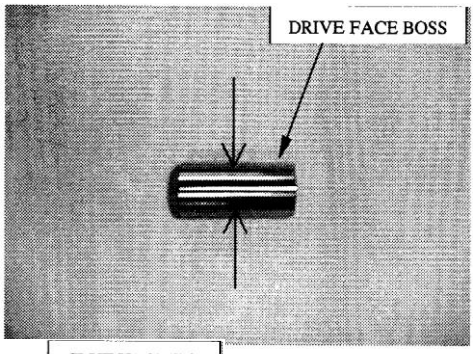


Photo 85

Inspect the clutch outer for wear or damage.
Measure the I.D. of clutch outer.
(Photo 86)
SERVICE LIMIT: 125.5 mm

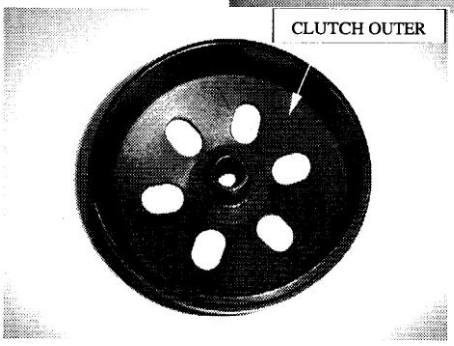


Photo 86

Inspect the clutch weight set for wear or damage.
Measure the thickness of clutch weight lining.
(Photo 87)
SERVICE LIMIT: 1.5mm

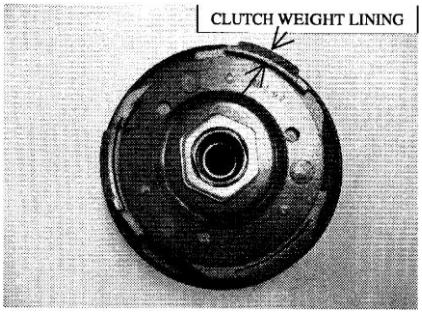


Photo 87

FIG-18. Engine Disassembly

TRANSMISSION & KICK STARTER

Measure the length of driven face spring
(Photo 88)
SERVICE LIMIT: 164.0 mm

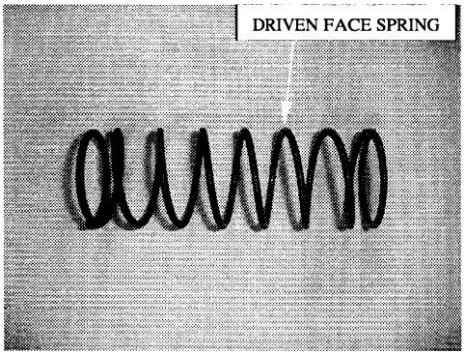


Photo 88

Inspect the driven face ass'y and replace them if necessary.
(Photo 89)

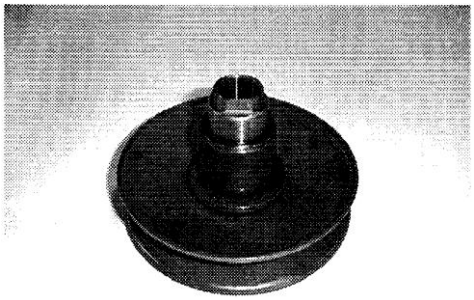


Photo 89

KICK STARTER DISASSEMBLY
Remove the kick-starter. (a-1)
Remove the LH crankcase cover. (a-2)
(Photo 90)

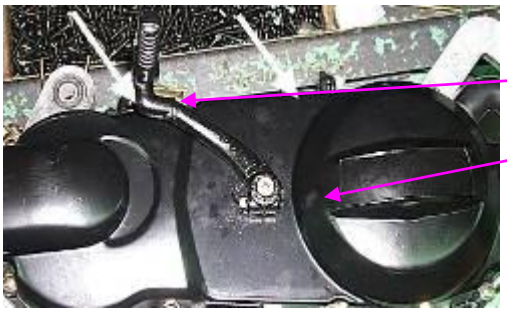


Photo 90

Remove the ex. Circle-clip and washer from kick starter spindle composition. (a-1)
(Photo 91)

Remove the kick-starter spindle ass'y.
Remove the kick-starter idle gear ass'y
Remove the kick spindle bush.
(Photo 92)

Photo 91

Photo 92

FIG-18. Engine Disassembly

TRANSMISSION & KICK STARTER

INSPECTION

Inspect the kick-starter spindle composition for wear or damage.
(Photo 93)

Photo 93

Inspect the kick-starter return spring for fatigue or damage
Inspect the kick-starter spindle bush for wear of damage.
(Photo 94)

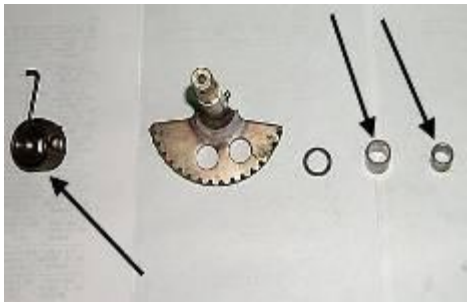


Photo 94

Inspect the kick–starter gear and spring for wear or damage.
(Photo 95)

Photo 95

KICK-STARTER ASSEMBLY

C.V.T ASSEMBLY

Annotate:

Refer the foregoing disassembly procedures to re-assemble.

MEMO

FIG-19. Electric System

Troubleshooting

ENGINE STARTS BUT STOPS	**IMPROPER IGNITION TIMING** **FAULTY SPARK PLUG**
NO SPARK AT PLUG	**ENGINE STOP SWITCH AT LEFT OR RIGHT POSITION** **GEARSHIFT BAR IS NOT AT NEUTRAL POSITION** **FAULTY IGNITION COIL** **FAULTY GENERATOR** **FAULTY CDI UNIT** **POORLY CONNECTED:** **Between CDI and ignition coil** **Between alternator and CDI unit** **Between CDI and engine stop switch** **Between ignition coil and spark plug** **Between generator and CDI unit**
ENGINE STARTS BUT RUNS POORLY	**IGNITION PRIMARY CIRCUIT** **Faulty generator** **Faulty CDI unit** **Faulty alternator** **Loosen contacted terminals** **Faulty ignition coil** **IGNITION SECONDARY CIRCUIT** **Faulty plug** **Loosen contacted spark plug wire** **IMPROPER IGNITION TIMING** **Faulty generator** **Faulty CDI unit**
CHARGING SYSTEM FAILURE	**LOOSE, BROKEN OR SHORTED WIRE.** **FAULTY ALTERNATOR** **FAULTY IGNITION SWITCH**

FIG-19. Electric System

Battery Electrolyte is poisonous. Drink large quantities of water or milk and call a physician if swallowed.

Troubleshooting

INTERMITTENT ENGINE POWER	**LOOSE BATTERY CONNECTION** **LOOSE CHARGING SYSTEM CONNECTION**
STARTER MOTOR WILL NOT TURN	**DEAD BATTERY** **FAULTY IGNITION SWITCH** **LOOSE OR DISCONNECTED WIRE**
STARTER MOTOR AND ENGINE TURN, BUT ENGINE DOES NOT START	**FAULTY IGNITION SYSTEM** **FAULTY ENGINE STOP SWITCH** **ENGINE PROBLEMS**
HEAD LIGHT DO NOT WORK	**THE SWITCH DO NOT PUSH TO THE "ON" POSITION** **THE LIGHT BULB IS BURN OUT, NEED BE REPLACED**

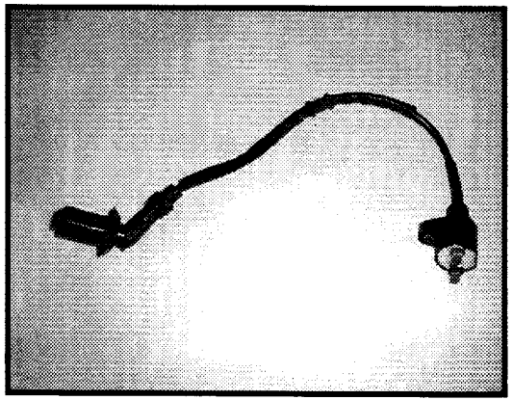
IGNITION COIL

Remove the spark plug cap from the spark plug.

Disconnect the ignition coil primary wire.

Measure the primary coil resistance.

STANDARD: 0.1-0.30Ω



Measure the secondary coil resistance with the spark plug cap in place.

STANDARD: 7.4-11 KΩ

IGNITION TIMING

The ignition advance is 13◦ ±1◦ /4000rpm

The capacitive discharge ignition (CDI) system is factory pre-set and does not require adjustment.

ALTERNATOR EXCITER COIL

Remove the seat/ rear fender and front fender.

disconnect the exciter coil wire.

Measure the resistance between the yellow or white or green wire and ground.

STANDARD : 467-700Ω

(Photo 2)

FIG-19. Electric System

Photo 1

BATTERY CAUTION

The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using the battery in an open area. The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield. ***Electrolyte is poisonous. Drink large quantities of water or milk and call a physician if swallowed***

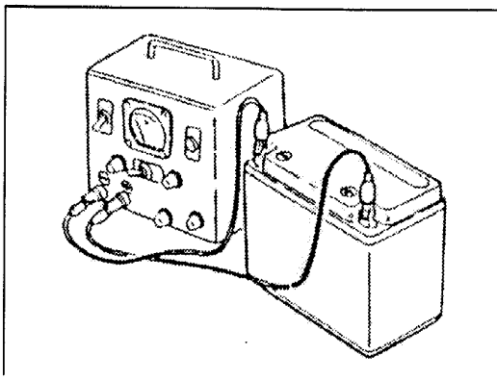
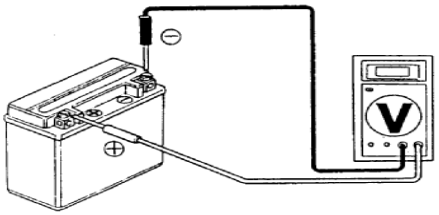


Photo 2

BATTERY VOLTAGE INSPECTION

Battery is under the seat; you can see this battery after removing the seat.

Measure the battery voltage using a voltmeter (Photo 1)



VOLTAGE: Fully charged: 13.1 V

Undercharged : Below 12.0 V

BATTERY REMOVAL

Remove the seat, and then you can see the battery. Disconnect the negative cable and then the position cable and remove the battery.

BATTERY INSTALLATION

Install the battery in the reverse order of removal. Apply clean dielectric grease to the battery terminals.

CHARGING

Connect the charge positive cable to the battery positive terminal. Connect the charge negative cable to the battery negative terminal. Using 0.9A charging current about 5 hours. (Normal charging) Or using 4A charging current about 1 hour. (Quick charging) Keep flames and spark away from a battery being charged. Quick charging should be limited to an emergency; normal charging is preferred.

FIG-19. Electric System

ELECTRIC STARTER

Information

A weak battery may be unable run the starter motor quickly enough.

If the battery voltage is enough while the engine is not cranking, the starter motor may be damaged.

Troubleshooting

Starter motor turns slowly

Weak battery.

Poorly connected starter motor cable.

Faulty starter motor.

Poorly connected battery ground cable.

Starter motor will not turn

Engine stop switch at left or right position.

Gearshift bar is not at neutral position.

Check for a blown fuse near battery.

Make sure that the battery is fully charged and in good condition.

MEMO

FIG-20. Trouble shooting

STARTING DIFFICULT

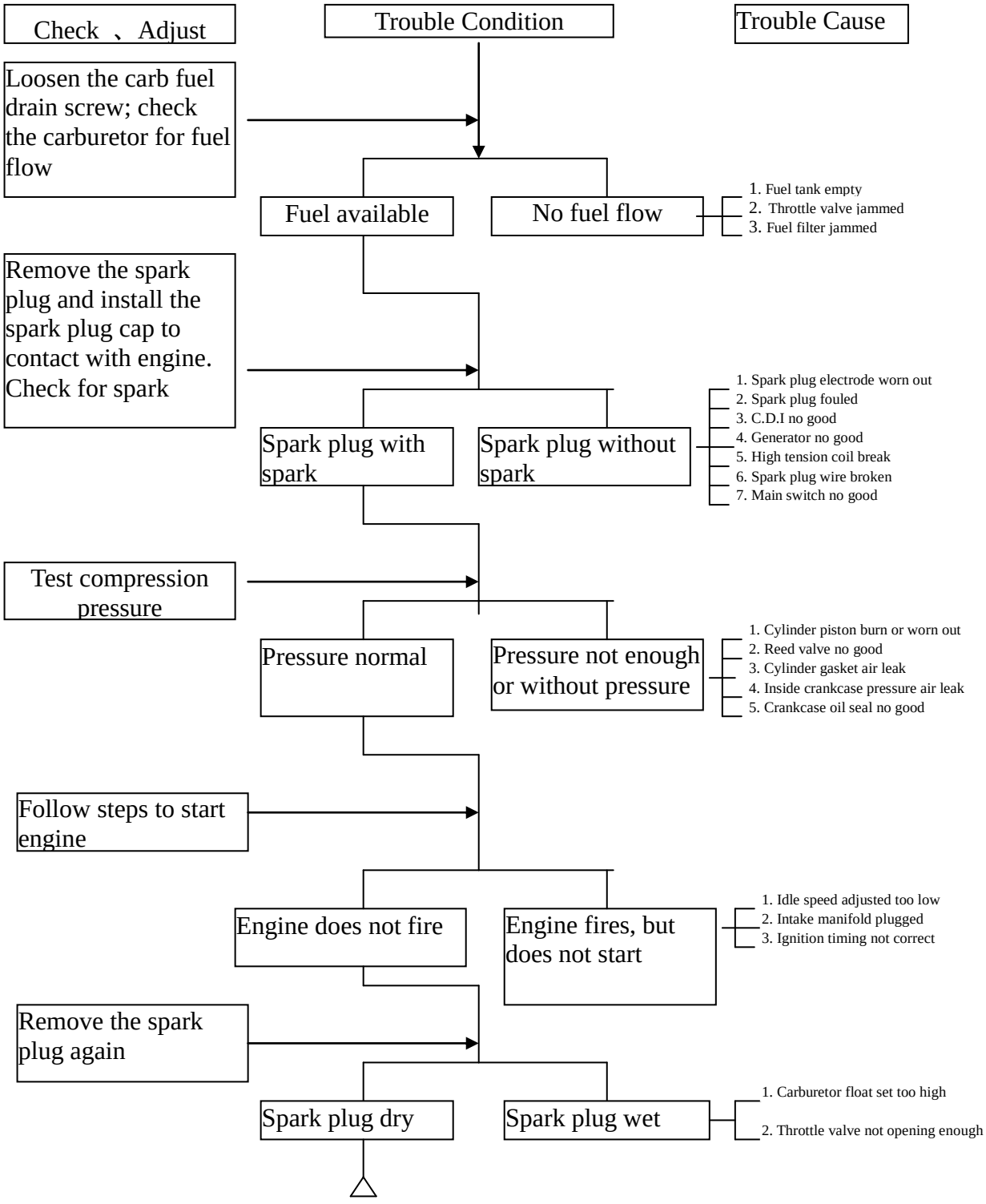

Check 、Adjust
Trouble Condition
Trouble Cause
Loosen the carb fuel drain screw; check the carburetor for fuel flow
Fuel available
No fuel flow
1. Fuel tank empty
2. Throttle valve jammed
3. Fuel filter jammed
Remove the spark plug and install the spark plug cap to contact with engine. Check for spark
Spark plug with spark
Spark plug without spark
1. Spark plug electrode worn out
2. Spark plug fouled
3. C.D.I no good
4. Generator no good
5. High tension coil break
6. Spark plug wire broken
7. Main switch no good
Test compression pressure
Pressure normal
Pressure not enough or without pressure
1. Cylinder piston burn or worn out
2. Reed valve no good
3. Cylinder gasket air leak
4. Inside crankcase pressure air leak
5. Crankcase oil seal no good
Follow steps to start engine
Engine does not fire
Engine fires, but does not start
1. Idle speed adjusted too low
2. Intake manifold plugged
3. Ignition timing not correct
Remove the spark plug again
Spark plug dry
Spark plug wet
1. Carburetor float set too high
2. Throttle valve not opening enough

FIG-20. Trouble shooting

STARTS BUT IMMEDIATELY STOPS

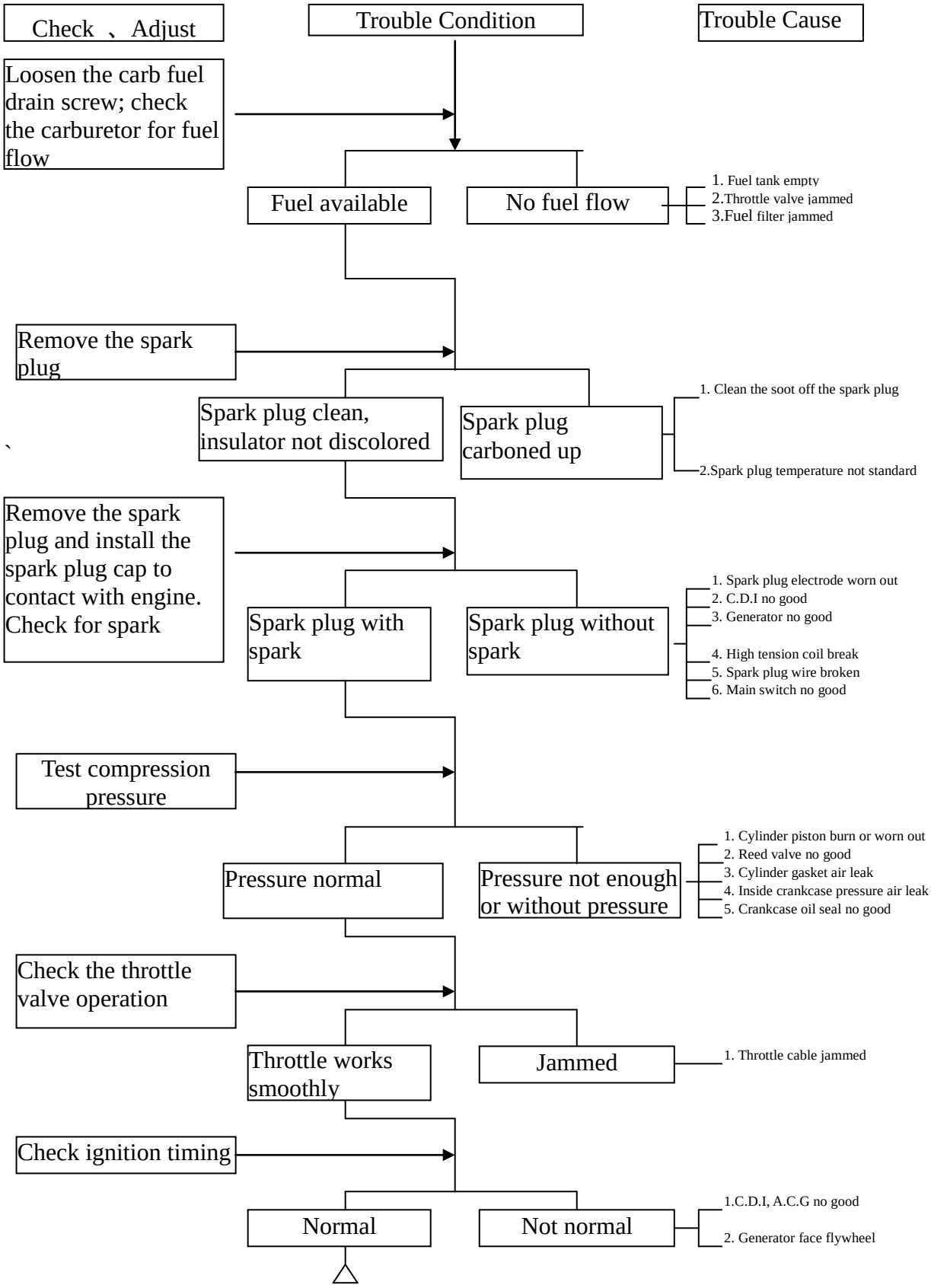

Check 、Adjust
Trouble Condition
Trouble Cause
Loosen the carb fuel drain screw; check the carburetor for fuel flow
Fuel available
No fuel flow
1. Fuel tank empty
2.Throttle valve jammed
3.Fuel filter jammed
Remove the spark plug
Spark plug clean, insulator not discolored
Spark plug carboned up
1. Clean the soot off the spark plug
2.Spark plug temperature not standard
Remove the spark plug and install the spark plug cap to contact with engine. Check for spark
Spark plug with spark
Spark plug without spark
1. Spark plug electrode worn out
2. C.D.I no good
3. Generator no good
4. High tension coil break
5. Spark plug wire broken
6. Main switch no good
Test compression pressure
Pressure normal
Pressure not enough or without pressure
1. Cylinder piston burn or worn out
2. Reed valve no good
3. Cylinder gasket air leak
4. Inside crankcase pressure air leak
5. Crankcase oil seal no good
Check the throttle valve operation
Throttle works smoothly
Jammed
1. Throttle cable jammed
Check ignition timing
Normal
Not normal
1.C.D.I, A.C.G no good
2. Generator face flywheel

FIG-20. Trouble shooting

STARTS BUT IMMEDIATELY STOPS

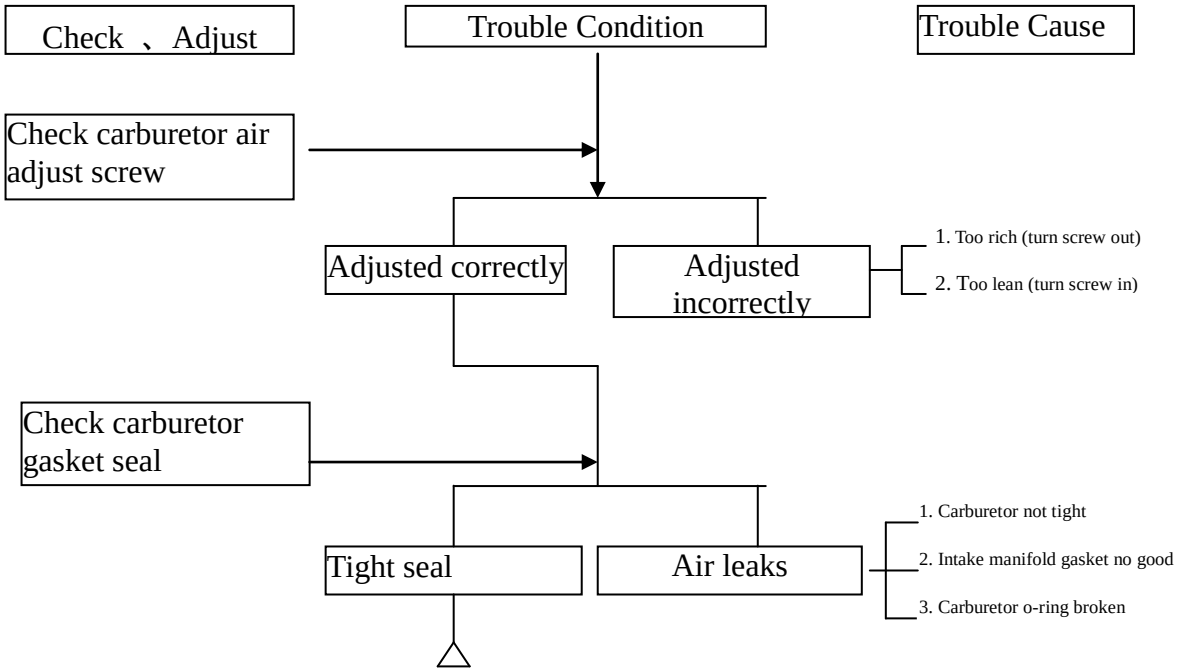
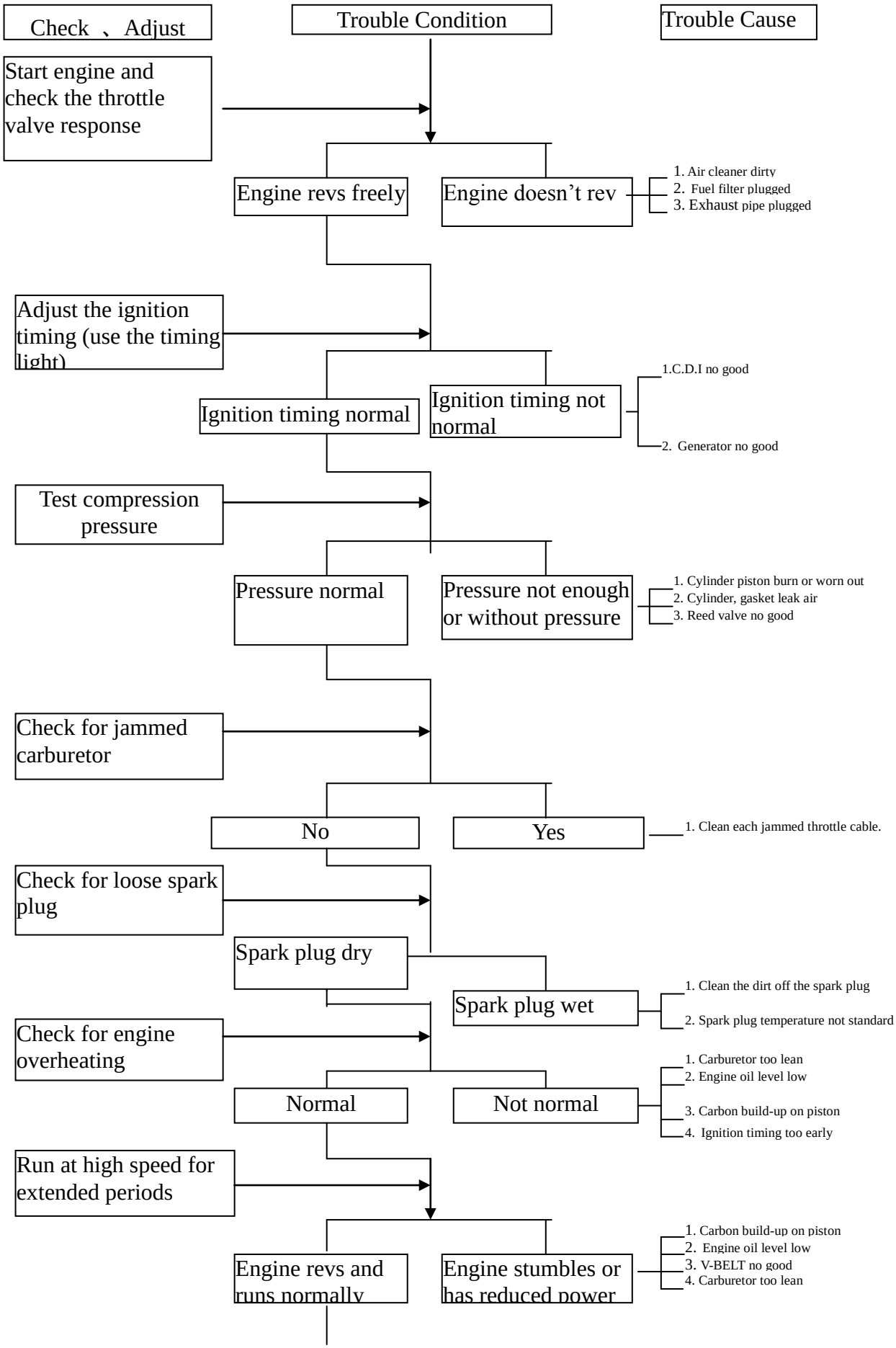


FIG-20. Trouble shooting

SPEED TOO SLOW、NO POWER


Check 、Adjust
Trouble Condition
Trouble Cause
Start engine and check the throttle valve response
Engine revs freely
Engine doesn't rev
1. Air cleaner dirty
2. Fuel filter plugged
3. Exhaust pipe plugged
Adjust the ignition timing (use the timing light)
Ignition timing normal
Ignition timing not normal
1.C.D.I no good
2. Generator no good
Test compression pressure
Pressure normal
Pressure not enough or without pressure
1. Cylinder piston burn or worn out
2. Cylinder, gasket leak air
3. Reed valve no good
Check for jammed carburetor
No
Yes
1. Clean each jammed throttle cable.
Check for loose spark plug
Spark plug dry
Spark plug wet
1. Clean the dirt off the spark plug
2. Spark plug temperature not standard
Check for engine overheating
Normal
Not normal
1. Carburetor too lean
2. Engine oil level low
3. Carbon build-up on piston
4. Ignition timing too early
Run at high speed for extended periods
Engine revs and runs normally
Engine stumbles or has reduced power
1. Carbon build-up on piston
2. Engine oil level low
3. V-BELT no good
4. Carburetor too lean

△

FIG-20. Trouble shooting

ENGINE RUNS ROUGH (ESPECIALLY AT LOW SPEED AND IDLING)

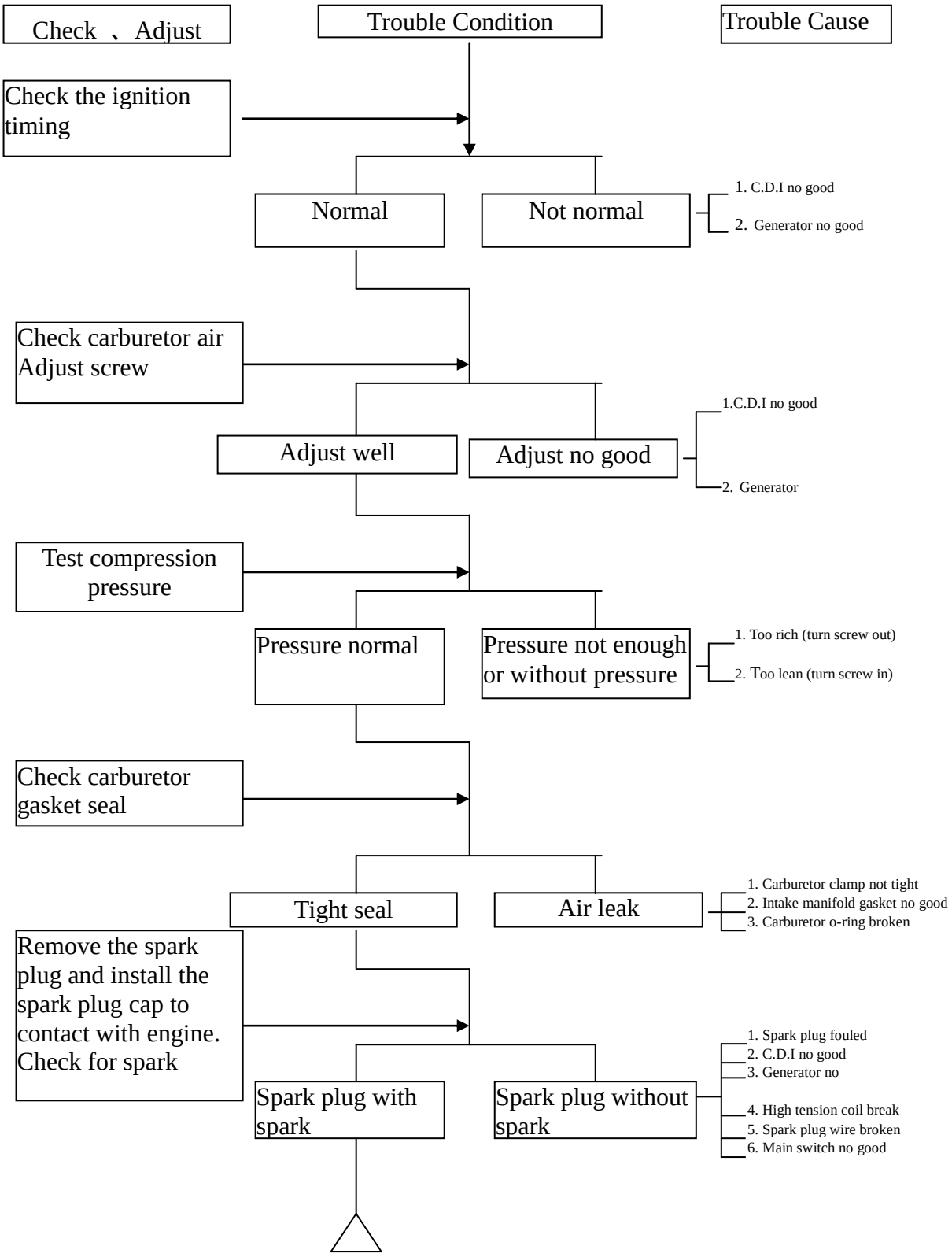

Check 、Adjust
Trouble Condition
Trouble Cause
Check the ignition timing
Normal
Not normal
1. C.D.I no good
2. Generator no good
Check carburetor air Adjust screw
Adjust well
Adjust no good
1.C.D.I no good
2. Generator
Test compression pressure
Pressure normal
Pressure not enough or without pressure
1. Too rich (turn screw out)
2. Too lean (turn screw in)
Check carburetor gasket seal
Tight seal
Air leak
1. Carburetor clamp not tight
2. Intake manifold gasket no good
3. Carburetor o-ring broken
Remove the spark plug and install the spark plug cap to contact with engine. Check for spark
Spark plug with spark
Spark plug without spark
1. Spark plug fouled
2. C.D.I no good
3. Generator no
4. High tension coil break
5. Spark plug wire broken
6. Main switch no good

FIG-20. Trouble shooting

ENGINE RUNS ROUGH (ESPECIALLY AT HIGH SPEED)

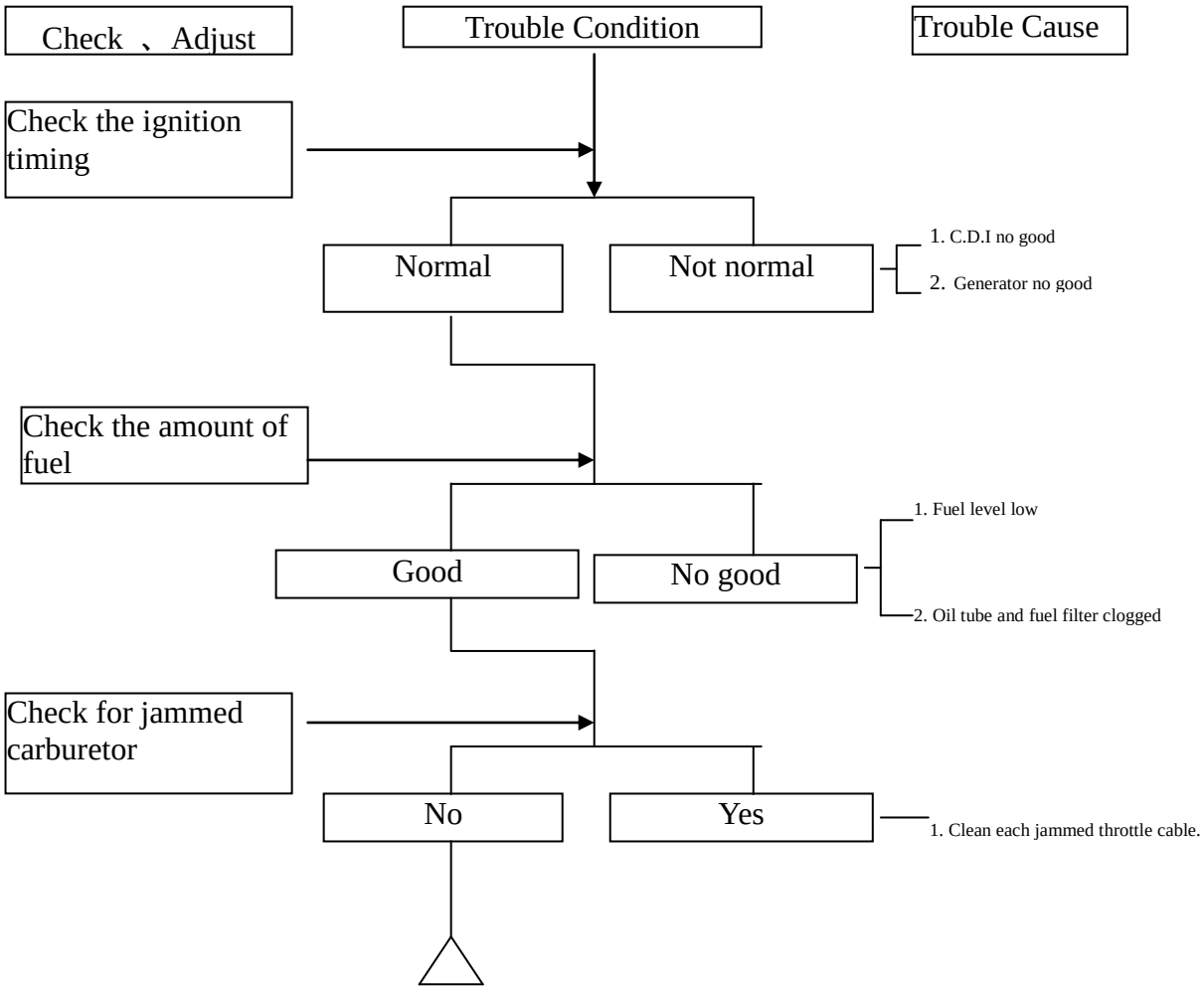


FIG-20. Trouble shooting
ABOUT THE CLUTCH AND DRIVE

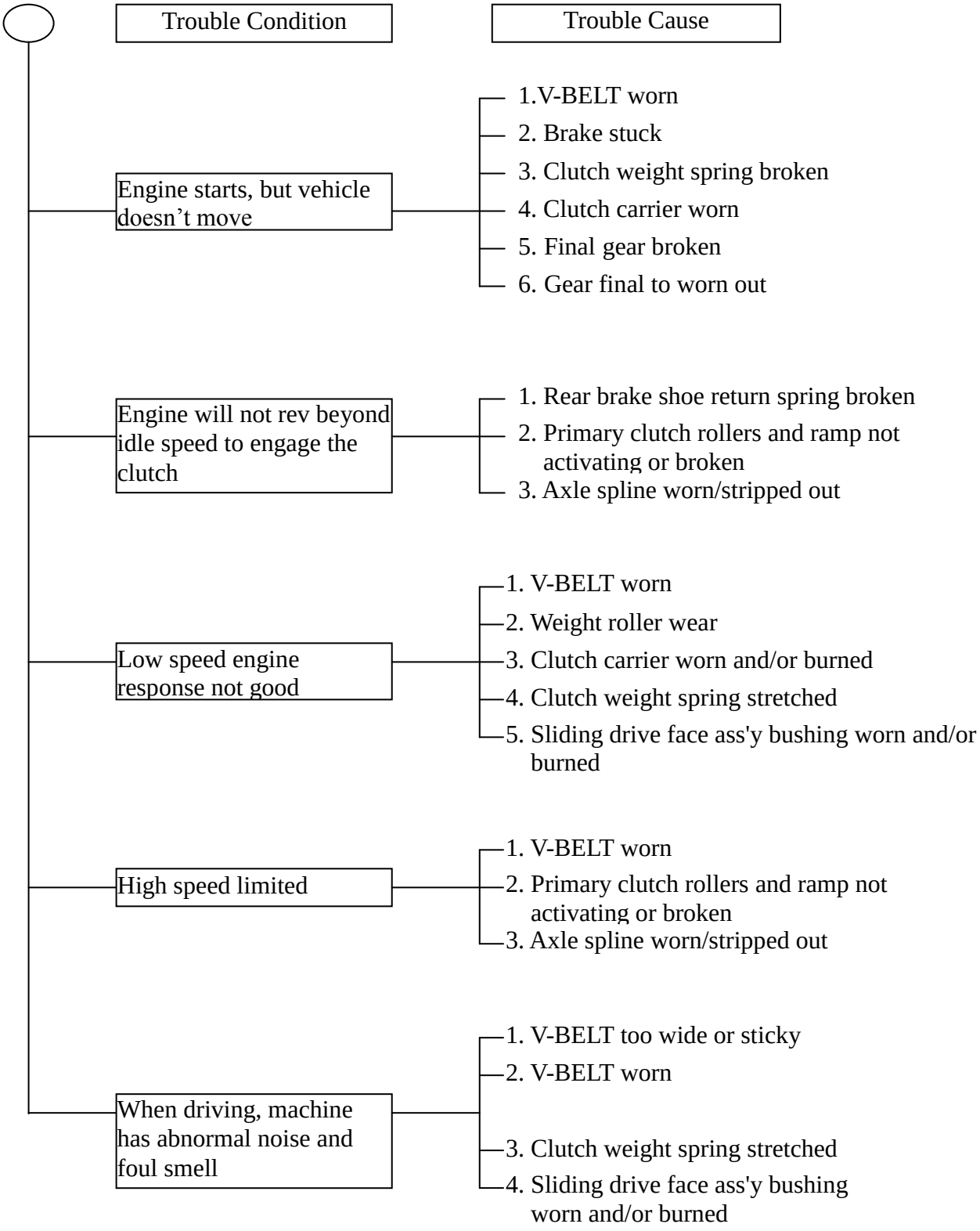
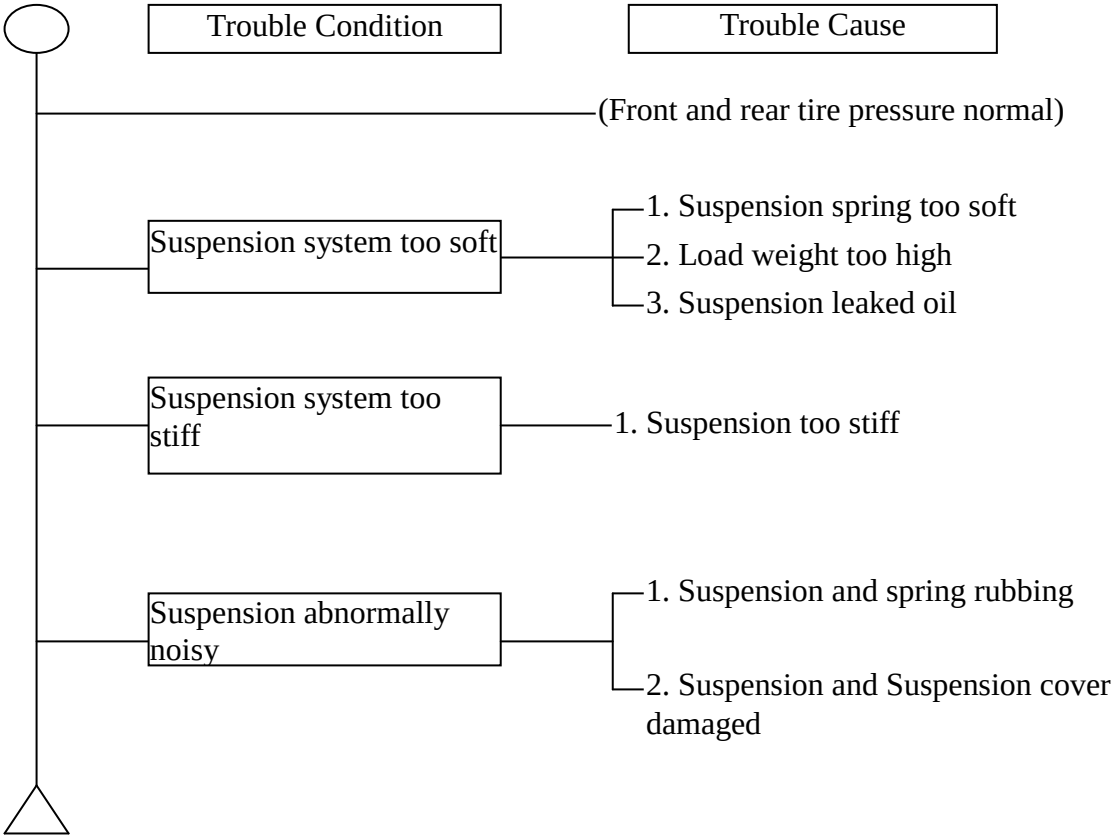

Trouble Condition
Trouble Cause
Engine starts, but vehicle doesn't move
1.V-BELT worn
2. Brake stuck
3. Clutch weight spring broken
4. Clutch carrier worn
5. Final gear broken
6. Gear final to worn out
Engine will not rev beyond idle speed to engage the clutch
1. Rear brake shoe return spring broken
2. Primary clutch rollers and ramp not activating or broken
3. Axle spline worn/stripped out
Low speed engine response not good
1. V-BELT worn
2. Weight roller wear
3. Clutch carrier worn and/or burned
4. Clutch weight spring stretched
5. Sliding drive face ass'y bushing worn and/or burned
High speed limited
1. V-BELT worn
2. Primary clutch rollers and ramp not activating or broken
3. Axle spline worn/stripped out
When driving, machine has abnormal noise and foul smell
1. V-BELT too wide or sticky
2. V-BELT worn
3. Clutch weight spring stretched
4. Sliding drive face ass'y bushing worn and/or burned

FIG-20. Trouble shooting

FRONT SUSPENSION AND REAR SUSPENSION NOT BALANCED


Trouble Condition
Trouble Cause
(Front and rear tire pressure normal)
Suspension system too soft
1. Suspension spring too soft
2. Load weight too high
3. Suspension leaked oil
Suspension system too stiff
1. Suspension too stiff
Suspension abnormally noisy
1. Suspension and spring rubbing
2. Suspension and Suspension cover damaged

BRAKE NO GOOD

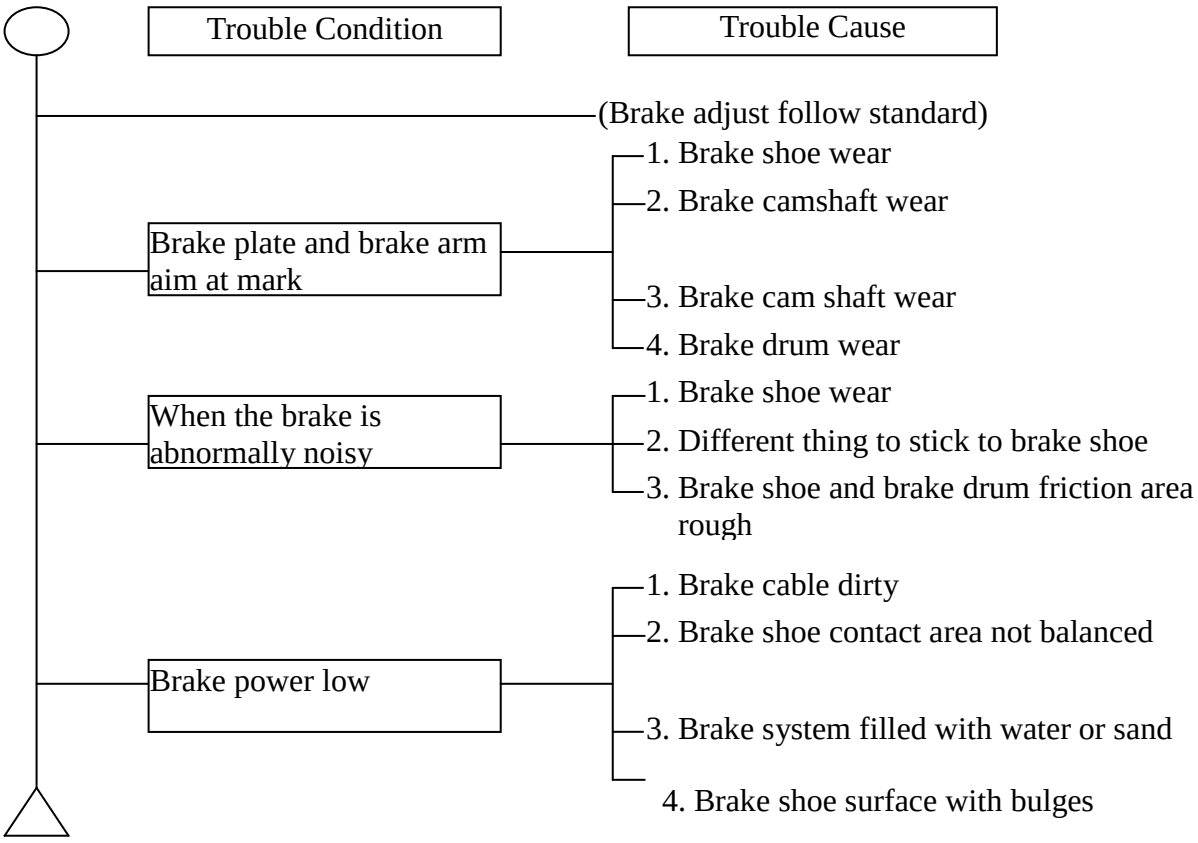
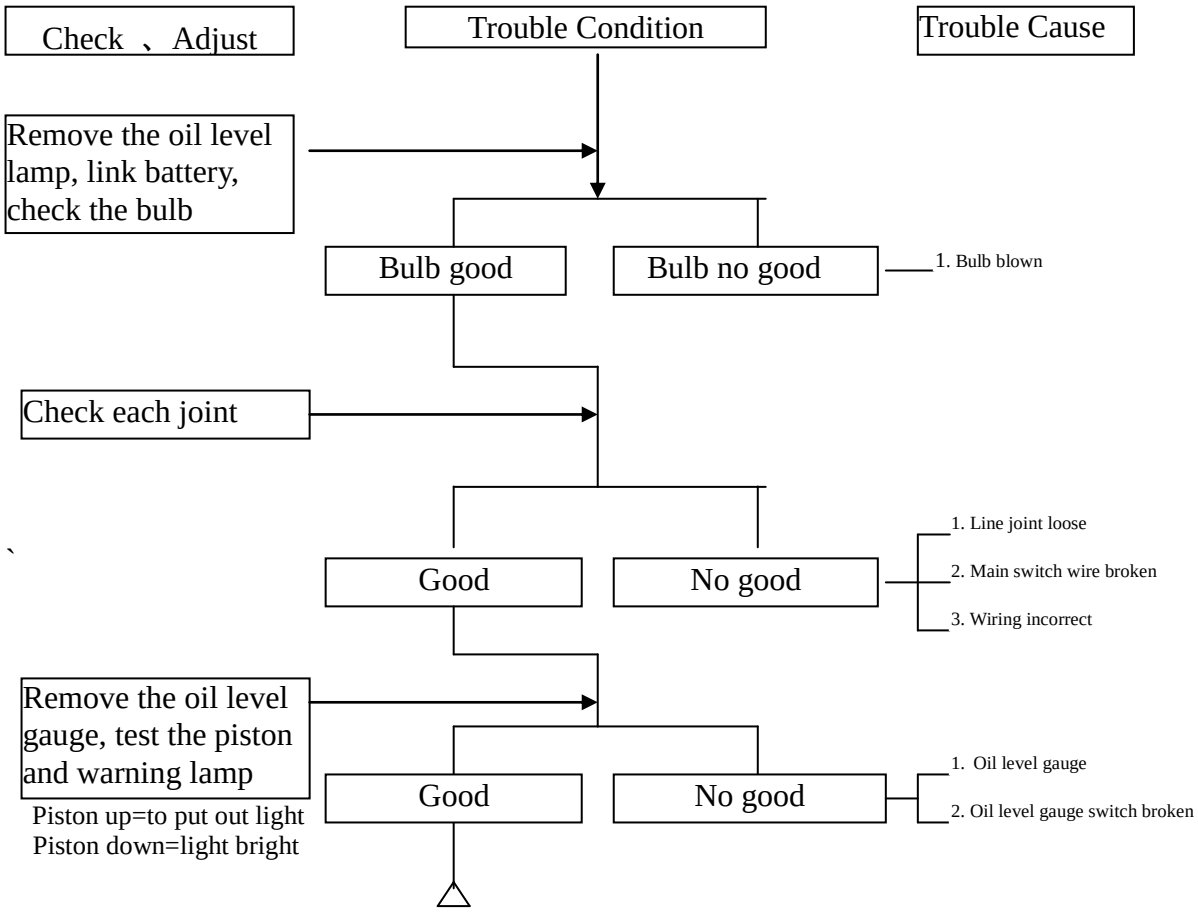

Trouble Condition
Trouble Cause
(Brake adjust follow standard)
Brake plate and brake arm aim at mark
1. Brake shoe wear
2. Brake camshaft wear
3. Brake cam shaft wear
4. Brake drum wear
When the brake is abnormally noisy
1. Brake shoe wear
2. Different thing to stick to brake shoe
3. Brake shoe and brake drum friction area rough
Brake power low
1. Brake cable dirty
2. Brake shoe contact area not balanced
3. Brake system filled with water or sand
4. Brake shoe surface with bulges

FIG-20. Trouble shooting

OIL LEVEL LOW BUT LAMP NOT BRIGHT (WHEN MAIN SWITCH “ON”)



OIL QUANTITY FULL BUT WARNING LIGHT BRIGHT (WHEN MAIN SWITCH “ON”)

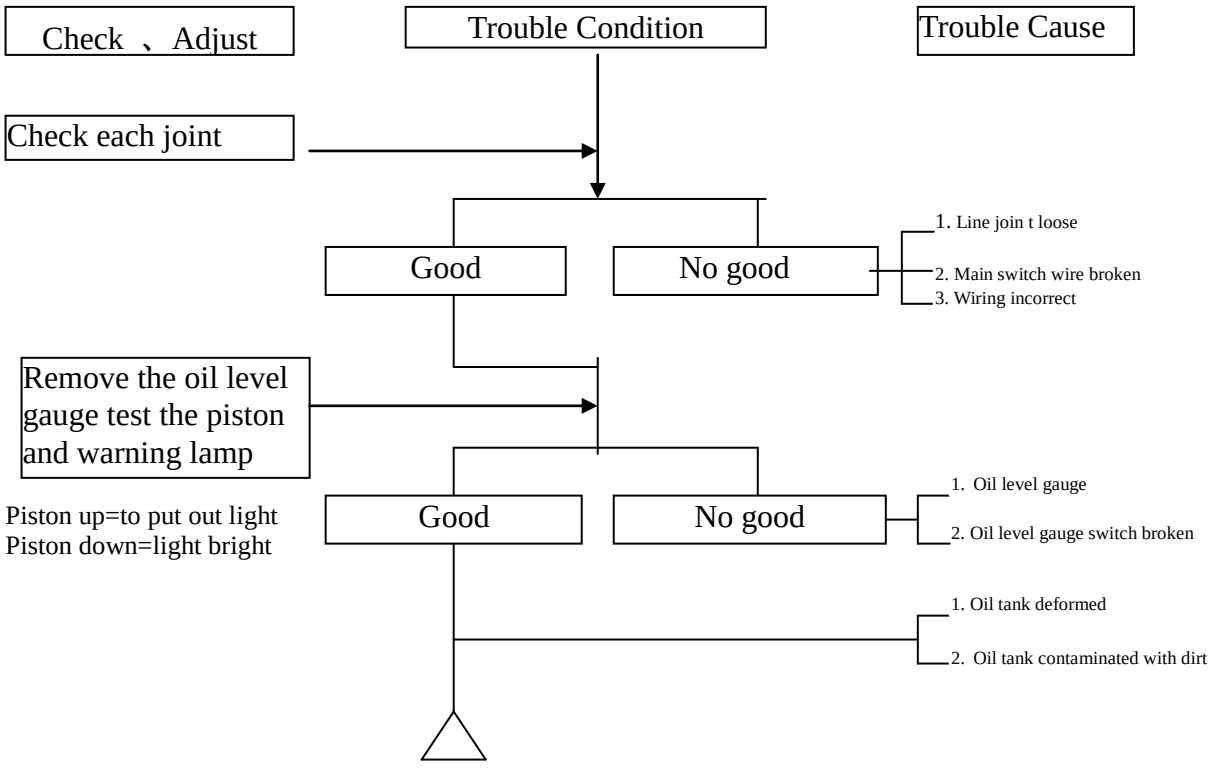


FIG-20. Trouble shooting

STARTING MOTOR DOES NOT SPIN

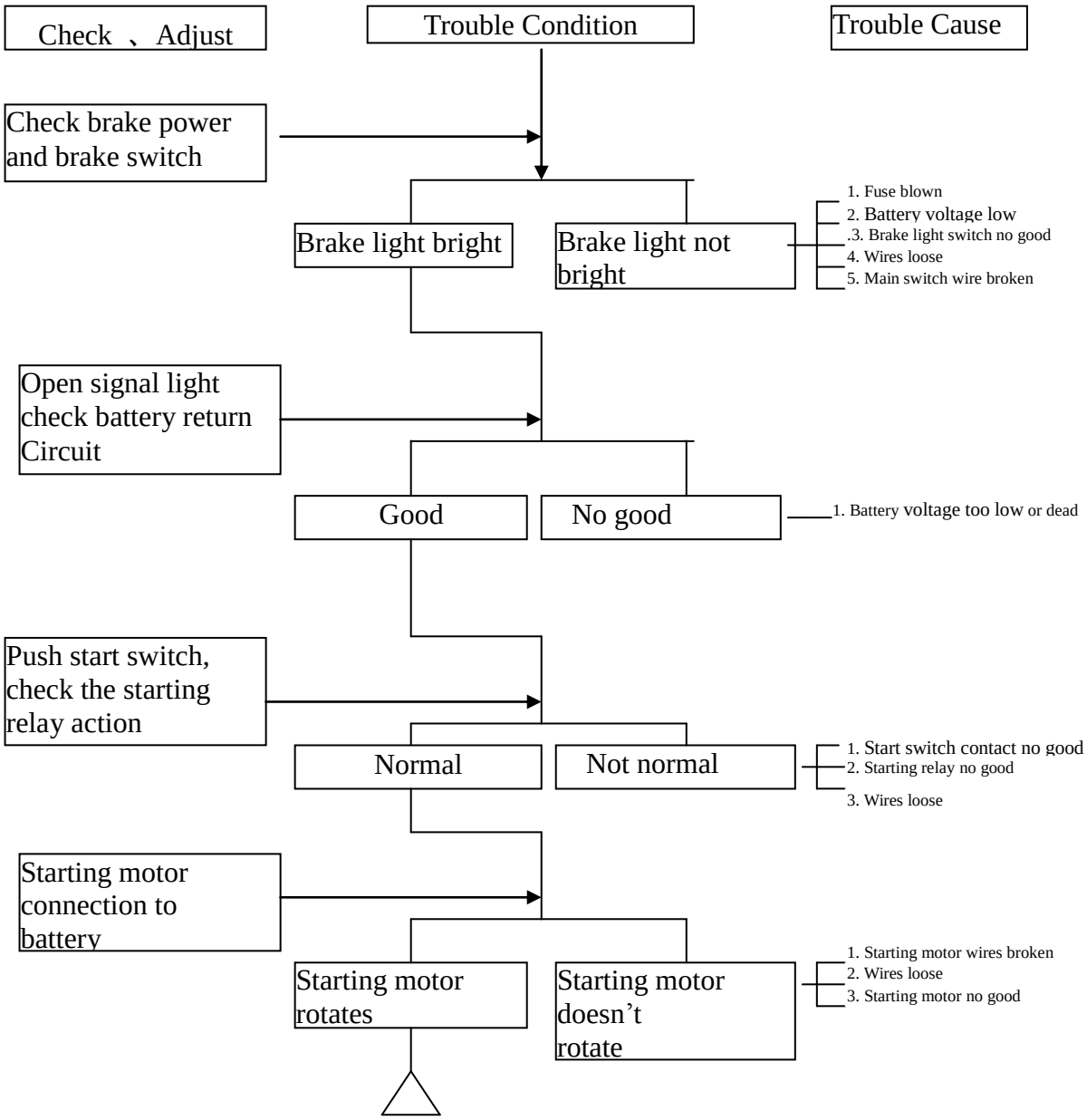
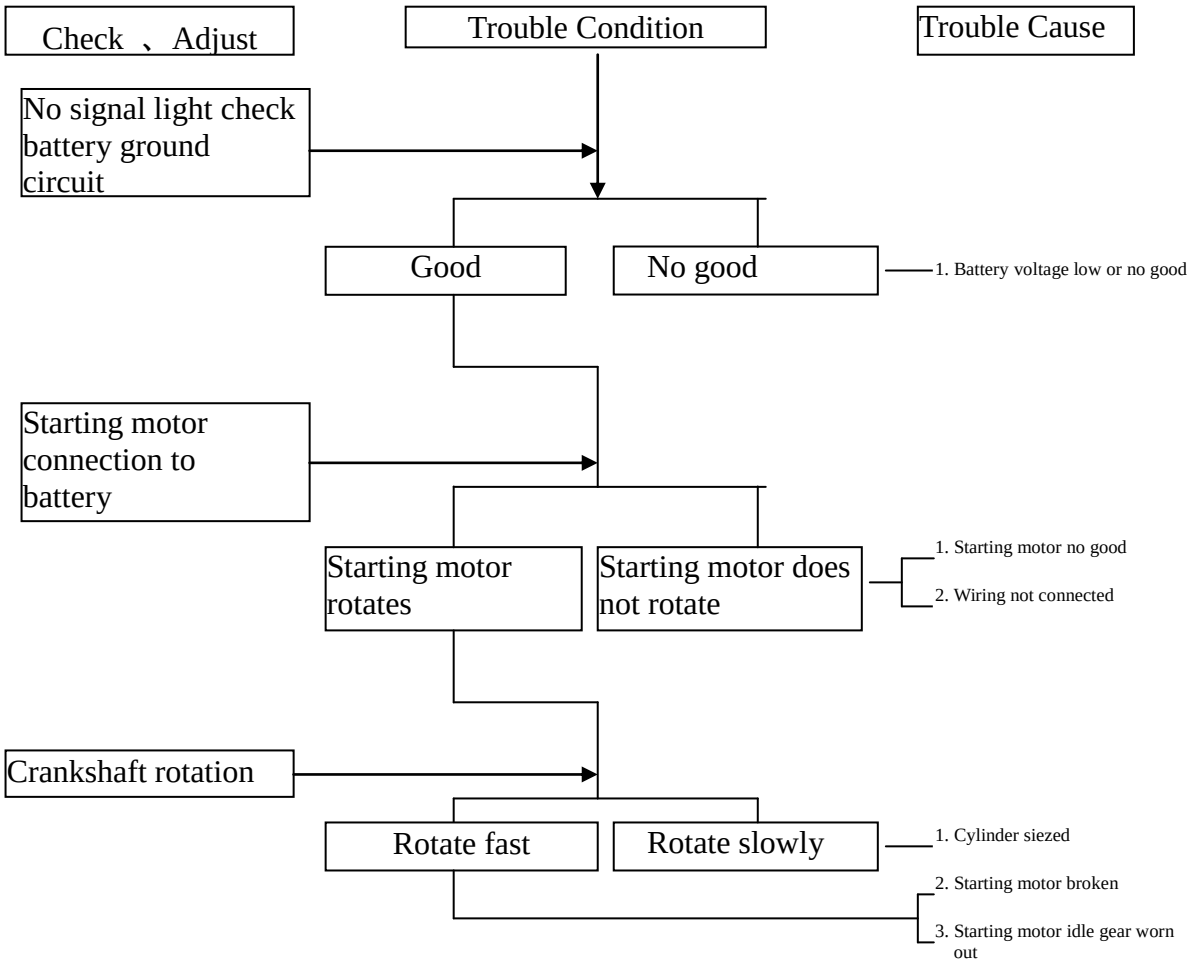
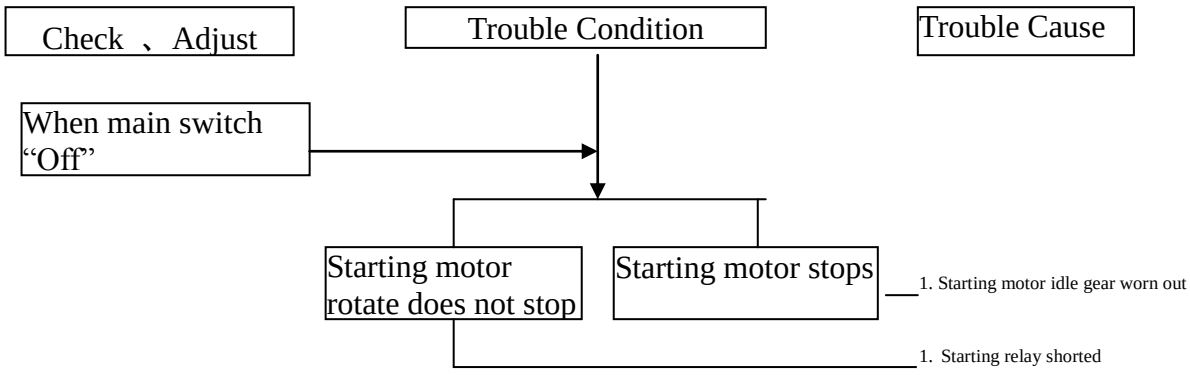

Check 、Adjust
Trouble Condition
Trouble Cause
Check brake power and brake switch
Brake light bright
Brake light not bright
1. Fuse blown
2. Battery voltage low
.3. Brake light switch no good
4. Wires loose
5. Main switch wire broken
Open signal light check battery return Circuit
Good
No good
1. Battery voltage too low or dead
Push start switch, check the starting relay action
Normal
Not normal
1. Start switch contact no good
2. Starting relay no good
3. Wires loose
Starting motor connection to battery
Starting motor rotates
Starting motor doesn't rotate
1. Starting motor wires broken
2. Wires loose
3. Starting motor no good

FIG-20. Trouble shooting

STARTING MOTOR SPINS SLOWLY OR TURNS WITHOUT ENGAGING MOTOR



STARTING MOTOR SPINS CONTINUOUSLY



MEMO

FIG-21. MAIN WIRING DIAGRAM